90-1670

No. _____

Supreme Court, U.S.
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In The

Supreme Court of the United States

October Term, 1990

KATHLEEN E. CONNORS, et al.,

Petitioners,

v.

UNITED STATES OF AMERICA,

Respondent.

Petition For A Writ Of Certiorari To The United States Court Of Appeals For The Fifth Circuit

PETITION FOR A WRIT OF CERTIORARI

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QUESTION PRESENTED

Whether the United States Court of Appeals for the Fifth Circuit's failure to review *de novo* the District Court's failure to apply the objective test required under Texas law on the dispositive proximate cause issue directly conflicts with this Court's intervening decision in *Salve Regina College v. Russell*, 59 U.S.L.W. 4219 (Mar. 20, 1991).

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UNITED STATES OF AMERICA,

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Petition For A Writ Of Certiorari To The United States Court Of Appeals For The Fifth Circuit

PETITION FOR A WRIT OF CERTIORARI

Kathleen E. Connors, Mary Elizabeth LaBrecque, Susan Connors DeCosta, Jill Wong, Jean R. Nassick, Michael N. Nassick, David Lee Nassick, and Delta Air Lines, Inc.[1] petition for a Writ of Certiorari to review the

[1] Pursuant to Sup. Ct. R. 29.1, Petitioners state that Delta Air Lines, Inc. has no parent or subsidiary corporations (other than wholly owned subsidiaries). Further, there are no other parties to this proceeding not listed in the caption or this list of Petitioners.

Judgment of the United States Court of Appeals for the Fifth Circuit in this case.

OPINIONS BELOW

The opinion of the United States Court of Appeals for the Fifth Circuit appears at 919 F.2d 1079. (App. *infra.*, 1-20) The Order of the Court of Appeals denying Delta Air Lines, Inc.'s Petition for Rehearing is reprinted at App. *infra.* at 23-24. The opinion of the District Court appears at 720 F.Supp. 1258. (App. *infra.*, 25-102)

JURISDICTION

The United States Court of Appeals for the Fifth Circuit entered its Judgment on January 2, 1991. (App. *infra.*, 21-22) On January 29, 1991, the Court of Appeals denied the Petition for Rehearing. (App. *infra.*, 23-24) Petitioners invoke the jurisdiction of the Supreme Court of the United States pursuant to 28 U.S.C. § 1254(1).

STATUTES AND RULES INVOLVED

28 U.S.C. § 2674 provides:

§ 2674. Liability of United States

> The United States shall be liable, respecting the provisions of this title relating to tort claims, in the same manner and to the same extent as a private individual under like circumstances, but shall not be liable for interest prior to judgment or for punitive damages.

If, however, in any case wherein death was caused, the law of the place where the act or omission complained of occurred provides, or has been construed to provide, for damages only punitive in nature, the United States shall be liable for actual or compensatory damages, measured by the pecuniary injuries resulting from such death to the persons respectively, for whose benefit the action was brought, in lieu thereof.

With respect to any claim under this chapter, the United States shall be entitled to assert any defense based upon judicial or legislative immunity which otherwise would have been available to the employee of the United States whose act or omission gave rise to the claim, as well as any other defenses to which the United States is entitled.

With respect to any claim to which this section applies, the Tennessee Valley Authority shall be entitled to assert any defense which otherwise would have been available to the employee based upon judicial or legislative immunity, which otherwise would have been available to the employee of the Tennessee Valley Authority whose act or omission gave rise to the claim as well as any other defenses to which the Tennessee Valley Authority is entitled under this chapter.

(As amended Nov. 18, 1988, Pub.L. 100-694, §§ 4, 9(c), 102 Stat. 4564, 4567.)

STATEMENT OF THE CASE

A. COURSE OF PROCEEDINGS AND DISPOSITION IN THE COURTS BELOW.

This appeal is part of the litigation that resulted from the August 2, 1985 crash of Delta Flight 191 at Dallas-Ft. Worth International Airport ("DFW" or "DFW Airport"). Kathleen E. Connors and Jean R. Nassick, respectively the widows of Delta 191's captain and second officer, and other surviving family members brought damage suits under the Federal Tort Claims Act, 28 U.S.C. § 2674, against the United States of America for the crew members' deaths based on the Texas Wrongful Death Act[2] and Survival Statute.[3] Delta Air Lines, Inc. ("Delta") joined in Mrs. Connors' suit to seek damages for the loss of its L-1011 aircraft, and made third party contribution claims in various suits by surviving passengers and beneficiaries of deceased passengers for amounts Delta paid to those parties.[4] The District Court consolidated the Connors/Delta case, the Nassick case, and the Delta third party actions for trial.

After a lengthy trial, the trial court entered judgment in favor of the government, holding that Delta's flight crew and Federal Aviation Administration ("FAA") and

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[2] Tex. Rev. Stat. Ann. art. 4671, *et seq.* (recodified as Tex. Civ. Prac. & Rem. Code §§ 71.001, effective September 1, 1985).

[3] Tex. Rev. Stat. Ann. art. 5525 (recodified as Tex. Civ. Prac. & Rem. Code § 71.021, effective September 1, 1985).

[4] The District Court opinion notes that those claims would aggregate to between $150 million and $200 million, including $24.7 million attributable to the loss of Delta's L-1011 aircraft. 720 F.Supp. at 1261-62.

National Weather Service ("NWS") employees all were negligent, but that only Delta's negligence proximately caused the crash.

Petitioners appealed the District Court's decision to the United States Court of Appeals for the Fifth Circuit. On January 2, 1991, the Court of Appeals affirmed the District Court's judgment in favor of the United States of America, rejecting Petitioners' central contention that the District Court fashioned and applied its own erroneous rule of proximate cause law instead of using the proper Texas objective standard, in holding that the Delta 191 flight crew's later negligence legally excused the government's earlier negligent failure to warn.

B. STATEMENT OF FACTS

The following fact statement reflects District Court fact findings that Petitioners did not challenge in the Court of Appeals.

On the final leg of its approach to the north end of DFW runway 17L, Delta 191 entered light rain from Cell C, originally a cumulus cloud mass that had developed into a rain shower located over the outer marker approximately five nautical miles north of the runway. At approximately 6:04:00,[5] Delta 191 transitioned from Cell C into light rain from Cell D,[6] a second cloud mass that rapidly had developed from a cumulus cloud mass into

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[5] All time references are stated in Central Daylight Time unless otherwise expressly noted in this Petition or in the District Court and Court of Appeals' opinions.

[6] 720 F.Supp. at 1282 n. 181. (App., *infra*, 79)

an extremely hazardous thunderstorm. The Delta crew was unaware of the extremely severe and hazardous weather in Cell D before encountering it in part because they failed to use onboard radar to determine the existence of potentially threatening weather before sighting lightning at 6:04:18, when already well inside Cell D. Delta policy, and prudent aviation practice, requires avoidance of known thunderstorms, particularly those of the intensity of Cell D.

Delta Flight 191 crashed 1.20 miles from the north end of DFW runway 17L after encountering an unusually strong downdraft windshear[7] produced by the Cell D thunderstorm's microburst.[8] From 6:05:35 on, the crew was attempting to go around,[9] but "[d]uring the last 17 seconds of the flight [from 6:05:35 to 6:05:52], the crew could not possibly have escaped from the microburst . . . ."[10] Thus, had the Delta 191 crew never entered Cell D or attempted to go around even one second earlier, the crash would not have occurred.

Well before First Officer Price observed lightning, FAA personnel at the DFW air traffic control tower ("DFW Tower") knew of the existence "of extreme and

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[7] Windshear is a change in the wind's speed and/or direction.

[8] A thunderstorm may produce a downburst or strong downdraft inducing an outburst of damaging winds on or near the ground. A microburst is a small downburst with its outburst and damaging winds extending only four kilometers (2.5 miles) or less. 720 F.Supp. at 1264-65. (App., *infra*, 37-38)

[9] *Id.* at 1278. (App., *infra*, 70)

[10] *Id.* at 1284. (App., *infra*, 86)

hazardous weather north of the airport,"[11] and negligently failed to provide that information to incoming aircraft. Moreover, DFW Tower employees observed the development of hazardous weather phenomenon, including an area of "heavy, heavy rain" described as "a wall or curtain of water, portions of which resembled a tornado," and "radar . . . returns on the north end of the runway,"[12] all unknown to the Delta 191 crew. An NWS meteorologist and the FAA Weather Coordinator also failed to monitor the weather on a radar display which would have shown Cell D as probably a very strong thunderstorm, and breached their legal duty to disseminate that information.[13] Since that, too, was never communicated to Delta 191, the crew did not follow the policy of avoidance of known thunderstorms, and entered Cell D uninformed and unaware of the hazardous weather conditions inside it that caused the crash.

REASONS FOR GRANTING THE WRIT

A. AFTER THE DECISION BELOW, THE SUPREME COURT HELD THAT COURTS OF APPEALS MUST REVIEW A DISTRICT COURT'S DETERMINATION OF STATE LAW *DE NOVO*.

After the Court of Appeals' decision below, The Supreme Court of the United States resolved a conflict among the circuits, and held that a Court of Appeals must review a District Court's determination of state law

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[11] *Id.* at 1288. (App., *infra*, 98)

[12] *Id.* (App., *infra*, 97-98)

[13] *Id.* (App., *infra*, 98-99)

de novo. Salve Regina College v. Russell, 59 U.S.L.W. 4219 (Mar. 20, 1991). There, this Court noted:

1. "Independent appellate review of legal issues best serves the dual goals of doctrinal coherence and economy of judicial administration."

2. Courts of Appeals are "structurally suited to the collaborative juridical process that promotes decisional accuracy" while "District Judges preside alone over fast-paced trials. Of necessity, they devote much of their energy and resources to hearing witnesses and reviewing evidence."

3. Courts of Appeals that profess to grant deference to a district court's determination of state law cannot be presumed to actually undertake plenary review of state law determinations.[14]

The Supreme Court concluded that appellate review of a district court's determination of state law under a standard less probing than that applied to a determination of federal law is unacceptable.

B. THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT LONG HAS FOLLOWED THE DEFERENTIAL STANDARD *RUSSELL* DISCARDED.

The Supreme Court noted in *Russell* that a majority of the Courts of Appeals followed the rule of deference,[15] but recently the Third and Ninth Circuits concluded that

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[14] 59 U.S.L.W. at 4220-21.

[15] *Id.* at 4220.

an appellate court should conduct a plenary review of a district court's state law determination.[16] The opinion does not cite any Fifth Circuit decision on the issue. The Supreme Court, however, makes several references to Professor Coenen's law review article[17] that catalogs the Courts of Appeals' decisions and places the Fifth Circuit squarely in the camp of those applying the now improper deferential standard. "The Fifth Circuit often has recognized and applied the rule of deference."[18] The article, published in 1989, noted that at least forty-five Fifth Circuit decisions had cited the rule, and most had stated that a federal district judge's determination is entitled to "great weight" on appellate review.[19]

C. THE COURT OF APPEALS BELOW UNQUESTIONABLY APPLIED THE NOW INVALID "GREAT WEIGHT" STANDARD ON THE DISPOSITIVE TEXAS PROXIMATE CAUSE LAW ISSUE.

Petitioners' central argument to the Fifth Circuit was that the District Court fashioned and applied its own erroneous rule of proximate cause law, and failed to

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[16] *See Craig v. Lake Asbestos of Quebec, Ltd.*, 843 F.2d 145, 148 (3d. Cir. 1988); *In Re McLinn*, 739 F.2d 1395 (9th Cir. 1984).

[17] Coenen, *To Defer or Not to Defer: A Study of Federal Court Deference to District Court Rulings on State Law*, 73 Minn. L.Rev. 899 (1989).

[18] *Id.* at 974.

[19] *Id.* at 975 (citing, *e.g.*, *Merchants Nat'l. Bank v. Southwestern Fire Ins. Co.*, 854 F.2d 100, 105 (5th Cir. 1988); *Foreman v. Exxon Corp.*, 770 F.2d 490, 496 n.9 (5th Cir. 1985); *Tran v. Manitowoc Eng'g. Co.*, 767 F.2d 223, 229 (5th Cir. 1985)).

apply the objective standard required under modern Texas comparative negligence law to determine the legal effect of the government's negligent failure to warn. Petitioners contended that the specific and dispositive "objective" proximate cause inquiry under Texas law is whether a reasonably prudent flight crew with only the actual knowledge of the Delta 191 crew concerning the existence or intensity of the Cell D thunderstorm probably would have followed established Delta policy and avoided the Cell D thunderstorm entirely had the controllers, prior to 6:03:58, communicated to that reasonably prudent crew what they and the NWS meteorologist actually knew and should have known. Further, is it reasonably foreseeable that a crash, or some similar event might occur in the absence of that communication when the unaware crew continued the approach and entered the Cell D thunderstorm.

It is rationally impossible to answer these questions in the negative. Therefore, under the objective standard, the District Court's subsidiary findings conclusively establish the negligence of the FAA and NWS employees as at least a concurrent proximate cause under Texas law of the Delta 191 crash. Texas courts have clearly recognized that particular facts may establish proximate cause as a matter of law.[20] No direct Texas authority exists on this point, but Petitioners referred to other aviation

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[20] *Eagle Trucking Co. v. Texas Bitulithic Co.*, 612 S.W.2d 503, 507 (Tex. 1981); *Missouri R.R. Co. v. American Statesman*, 552 S.W.2d 99 (Tex. 1977); *Parrott v. Garcia*, 436 S.W.2d 897, 900 (Tex. 1969).

cases[21] and two analogous Texas medical malpractice cases involving informed consent where Texas courts had applied an objective proximate cause standard.

The District Court's opinion never mentioned or considered the objective proximate cause standard. Its discussion of proximate cause law was sparse and cryptic. It devoted approximately one-half page of a lengthy opinion to a discussion of proximate cause law, and relied upon a case applying Louisiana contributory rather than comparative negligence law for its own alleged general rule of proximate cause law that the later negligence of a pilot or flight crew automatically relieves the government of its own prior negligence.[22] The District Court never discussed the critical proximate cause issue under Texas proximate cause law of the probable effect of full and timely warnings and advice concerning the hazards of the Cell D thunderstorm based on the government's actual and constructive knowledge on a reasonably prudent incoming crew with only the actual (not constructive) knowledge of the Delta 191 crew (*i.e.*, unaware because it had not used its onboard radar) about the development, existence, location, and intensity of the Cell D thunderstorm.

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[21] *Springer v. United States*, 641 F.Supp. 913 (D.S.C. 1986), *aff'd*, 819 F.2d 1139 (4th Cir. 1987); *Roland v. United States*, 463 F.Supp. 852 (S.D.Ind. 1978); *McKinley v. Stripling*, 763 S.W.2d 407, 410 (Tex. 1989); *Karp v. Cooley*, 493 F.2d 408, 422 n. 18 (5th Cir.), *cert. denied*, 419 U.S. 845 (1974).

[22] 720 F.Supp. at 1290, citing *Black v. United States*, 441 F.2d 741, 745 (5th Cir.), *cert. denied*, 404 U.S. 913 (1971).

The Court of Appeals likewise never addressed whether Texas law requires application of the objective proximate cause test. At one point, it acknowledged Petitioners' argument that Texas law requires application of an objective proximate cause standard: "They [Petitioners] argue that the controllers' negligence was a 'but for' cause of the accident if proper warnings and advice probably would have caused a reasonably prudent crew, unaware of the actual weather conditions, to avoid Cell D before entering it at 6:04:00 or to execute a missed approach before 6:05:35 p.m."[23] The opinion, however, never addressed that critical issue. Instead, the Court of Appeals invoked the deferential "great weight" standard of review that *Russell* expressly discarded, stating:

> "The [District] Court's discussion of Texas proximate cause law alone covers over half of a printed page. The trial judge has enjoyed a long experience of the law of Texas – his native state – and it has long been the view of our circuit that the views of such jurists as to state law are deserving of great weight. *See Westinghouse Electric Supply Co. v. Wesley Construction Co.*, 414 F.2d 1280, 1281 n.1 (5th Cir. 1969). By parity of reasoning, we are entitled to assume a general knowledge of that law on the part of such a magistrate, certainly of its basic principles."[24]

Petitioners demonstrated to the Court of Appeals that the District Court's proximate cause holding appears to represent an application of long discarded principles of negligence and contributory negligence under Texas law.

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[23] 919 F.2d at 1086. (App., *infra*, 15-16)

[24] *Id.* (App., *infra*, 15-16)

Prior to the adoption of a comparative negligence system, Texas case law recognized several doctrines, including last clear chance, and discovered peril, that accorded significance to the time at which a negligent act or omission occurred, or a party realized a danger or risk existed. The District Court's opinion states: "Any failure of the Air Traffic Controllers to warn a pilot of the presence of a storm in its path cannot be regarded as a continuing proximate cause after the pilot itself discovered its presence, appreciated the danger, and decided to fly ahead into it."[25] The statement reflects application of a general legal rule ("Any failure of the Air Traffic Controllers to warn a pilot. . . . "). It also makes clear allusions to Texas precomparative negligence doctrines of discovered peril and/or last clear chance ("cannot be regarded as a continuing proximate cause after the pilot himself discovered its presence"), and *volenti non fit injuria* ("appreciated the danger and decided to fly ahead into it. . . . "). With the adoption of a comparative negligence system, the Texas Supreme Court abolished those doctrines.[26]

Again the Court of Appeals avoided direct consideration of this argument by invoking the deferential standard *Russell* later discarded. It acknowledged the precomparative negligence allusions with a cryptic analogy and a profession of blind faith in the trial judge's knowledge of modern Texas proximate cause law:

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[25] 720 F.Supp. at 1290. (App., *infra*, 101)

[26] *French v. Grigsby*, 571 S.W.2d 867 (Tex. 1978) (abolishing discovered peril and/or last clear chance); *Farley v. M M Cattle Co.*, 529 S.W.2d 751 (Tex. 1975) (abolishing *volenti non fit injuria*).

> "We take a similar view of Appellants' contentions that the trial judge revived and applied the long defunct doctrines of last clear chance and discovered peril, or viewed the air crew's persistence in landing despite the storm as a new and independent cause of the accident. It is certainly possible to read the passages which Appellants seize upon and quote in such a manner, just as it is possible to read visions of archery into a reference to an upshot. To do so, however, it would be necessary for us to assume that the Court was ignorant (and uninformed by counsel) of a decade's developments in Texas tort law, a most unlikely circumstance."[27]

Russell establishes that the Fifth Circuit improperly failed to analyze the trial court's specific language:

> "Independent appellate review necessarily entails a careful consideration of the district court's legal analysis, and an efficient and sensitive appellate court at least will reasonably consider this analysis in undertaking its review . . . Independent review, however, does not admit of unreflective reliance on a lower court's inarticulable intuitions. Thus, an appropriately respectful application of *de novo* review should encourage a district court to explicate with care the basis for its legal conclusions."[28]

The Fifth Circuit's assumption also is unjustified. In the District Court, the government vigorously contested the issue of its negligence, claiming that its employees had neither actual nor constructive knowledge of any hazardous weather conditions. Petitioners, however, relied on evidence from numerous pilots and other witnesses at

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[27] 919 F.2d at 1087. (App., *infra*, 17)

[28] 59 U.S.L.W. at 4221.

D-FW who observed hazardous weather at the approach end of runway 17L before 6:05:35 to establish the government's actual and/or constructive knowledge. To counter this testimony, the government blamed the pilots on the ground. It not only contended these pilots should have made pilot reports ("PIREPS") of the hazardous weather, but also argued that their failure to do so proximately caused the accident. In the "United States of America's Response to Delta's Trial Brief Regarding the Duty of Pilots on the Ground to Report Weather Information", the government stated that "these violations and breach [failure to make PIREPS] proximately caused or contributed to the Delta 191 accident".[29] Further, the "Outline of Proof of the United States of America", filed at the end of trial, states that "[i]f the pilots on the ground who saw a hazard had made a PIREP, the accident would have been avoided".[30] Even the government's FAA Air Traffic Control expert conceded:

> "I have agreed, sir, that if the Tower controllers saw what the pilots on the ground apparently saw and relayed that information, then we probably wouldn't be here."[31]

Thus, the government contested the fact issue of its level of knowledge, not the causal effect of that knowledge once established.

For this reason, the parties never briefed the question of whether Texas law requires application of an objective proximate cause standard at the District Court level. The

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[29] App., *infra*, 104.

[30] App., *infra*, 105.

[31] Tr. Vol. 42, p. 22.

specific issues of Texas proximate cause law presented in this appeal did not arise until the District Court issued its opinion. Petitioners felt the District Court's subsidiary fact finding conclusively established proximate cause under Texas law, and directly appealed that legal question. Because the Court of Appeals applied the improper pre-*Russell* standard of review, Petitioners never obtained meaningful appellate review of the District Court's determination of Texas proximate cause law.

If modern Texas comparative negligence law requires application of the objective proximate cause standard, Petitioners conclusively established that the government's negligence was a concurring proximate cause of the crash.[32] The Fifth Circuit then erred in failing to remand the case to allow the District Court to properly allocate causal negligence among the government, and the individual flight crew members. Texas law then clearly requires allocation of some percentage of causal negligence to the government.[33] The precise allocation would determine whether the flight crew member

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[32] In the Court of Appeals, the government argued against application of the objective standard, and Petitioners' formulation of the specific proximate cause inquiry applicable in this case. It never argued that, under Petitioners' test, the District Court's subsidiary fact findings did not conclusively establish the government's negligence as a concurring proximate cause under Texas law.

[33] *See id.* The applicable Texas Pattern Jury Charge comparative negligence submission also supports this view. It requires the trier of fact to ascertain the percentage of causal negligence, not the percentage, if any. 1 Texas Pattern Jury Charges PJC 4.03A (2d ed. 1987). (App., *infra*, 106)

survivors, and Delta, have viable damage claims.[34] The clearly erroneous standard then would govern any subsequent appellate review of the District Court's allocation.[35]

The Fifth Circuit's failure to conduct a *de novo* review of the District Court's determination of the dispositive issue of Texas proximate cause law deprived Petitioners of meaningful appellate consideration of that outcome determinative issue. The Supreme Court's intervening decision in *Russell* establishes that the Fifth Circuit erred in reviewing the District Court's determination under the deferential "great weight" standard. The appropriate relief in these circumstances is for the Supreme Court to grant the Petition for Writ of Certiorari, vacate the judgment below, and remand this case to the United States Court of Appeals for the Fifth Circuit for reconsideration in light of the *Russell* decision.[36]

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[34] The Court of Appeals erred in stating: " . . . since Texas does not maintain a pure comparative negligence system, the outcomes of Mrs. Connor's [sic] and Mrs. Nassick's wrongful death actions . . . would not be altered unless the air controllers were found to be at least equally at fault with the aircrew. . . . " 919 F.2d 1088 n.7 (App., *infra*, 19) The fellow servant bar prevents imputation of one flight crew member's fault to another. Thus, each set of survivors recover unless the district court allocates a greater percentage of causal negligence to the respective decedents.

[35] Should the District Court on agreement allocate 0% to the government, that would directly present the question of whether the trier of fact *must* allocate a percentage of causal negligence to each tortfeasor. That would present another issue of modern Texas comparative negligence law.

[36] *E.g., Kirwin v. Romano*, 425 U.S. 929 (1976); *John Nuveen & Co. v. Sanders*, 425 U.S. 929 (1976); *Lash v. Aikens*, 425 U.S. 947 (1976); R. Stern, E. Gressman, & S. Shapiro, *Supreme Court Practice* 203 (6th ed. 1986).

CONCLUSION

The Petition for a Writ of Certiorari to the United States Court of Appeals for the Fifth Circuit should be granted, the judgment below vacated, and the case remanded for further consideration in light of the Supreme Court's intervening decision in *Salve Regina College v. Russell*, 59 U.S.L.W. 4219 (March 20, 1991).

Respectfully submitted,

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In re AIR CRASH AT DALLAS/FORT WORTH AIRPORT ON AUGUST 2, 1985.

Kathleen E. CONNORS, on behalf of the beneficiaries of, and as Executrix of the Estate of Edward M. Connors, Deceased, and Delta Air Lines, Inc., Plaintiffs-Appellants,

v.

UNITED STATES of America, Defendant-Appellee.

Jean R. NASSICK, on behalf of the beneficiaries of, and as Executrix of the Estate of Nick N. Nassick, Deceased, Plaintiffs-Appellants,

v.

UNITED STATES of America, Defendant-Appellee.

No. 89-146.

United States Court of Appeals, Fifth Circuit.

Jan. 2, 1991.

Rehearing Denied Jan. 29, 1991.

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Clay Warner, Gary Green, Herndon, Va., for amicus curiae Air Line Pilots Ass'n, Intern.

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Appeal from the United States District Court for the Northern District of Texas.

Before GOLDBERG, GEE, and WILLIAMS, Circuit Judges.

GEE, Circuit Judge:

A little after 6:00 p.m., on August 2, 1985, the crew of Delta Flight 191 attempted to land at Dallas-Fort Worth International Airport (DFW) despite their knowledge of the presence of a thunderstorm on near final approach, between their aircraft and the runway. The ensuing air disaster claimed the lives of most of the passengers and crew, as well as that of a motorist whose automobile was struck by the careening aircraft.

In a bench trial, the district court concluded that, although both the aircrew and the government ground personnel were negligent, the negligence of the air traffic controllers in failing to warn of the storm was not a proximate cause of the tragedy because the crew of Flight 191 required no such warning – knowing what was known on the ground of the storm and more – and would not have acted on it. It therefore gave judgment for the United States. The court's opinion and findings may be found at 720 F.Supp. 1258. Delta Airlines and the estates and survivors of certain crew members appeal, chiefly asserting as error that the court misapplied the Texas law of proximate cause and that its findings of historical fact are clearly erroneous in various critical respects.

FACTS

The opinion of the district court is lucid and exhaustive, and we recapitulate its findings here in part only for the convenience of the reader of our decision.

Flight 191 departed Fort Lauderdale, Florida, at 4:21 p.m. EDT, August 2, 1985. The aircraft was a Lockheed L-1011, with an on-board weather radar which district court found was not used during the fatal approach to DFW airport. The following is a brief[1] summary of the events leading up to the Flight 191 crash.

Time	Event
5:12:26	Flight 191's Captain Connors receives approval from government air traffic controllers to route his approach to DFW over Blue Ridge, a path with heavier air traffic but better weather conditions than the Scurry area, over which Flight 191 originally was routed.
5:25:00	The meteorologist at the DFW Central Weather Service Unit (CWSU), an agency that aids air traffic controllers in the dissemination of weather information to aircraft pilots, leaves his post to take a dinner break, not to return until after Flight 191 crashed.
5:35:26	Flight 191 receives a recorded weather dispatch from DFW that had been prepared at 4:45 p.m. The dispatch tells Flight 191, among other things, that the temperature was 101, the

[1] The district court opinion includes a 20 page minute by minute (and in some cases second by second) chronology of the "most significant events" from 5:03:59 p.m., until 6:05:56 p.m. on August 2. This abridged version was culled from the district court's opinion.

dew point was 67, and that planes were making visual approaches to the airport. (The gap between the temperature and dew point should have been a clue to the pilots that thunderstorms could develop.)

5:45:00 Various personnel at DFW begin to notice clouds building up north of the airport.

5:50:00 Thunderstorm Cells "D" and "C" began to form and appear on ground radar.

5:51:19 Flight 191 Second Officer Nassick observes. "Looks like it's raining over Fort Worth"; an unknown voice comments . . . "Dallas"

5:52:00 Cells D and C would appear on Flight 191's on-board radar at about this time were if operating.

5:55:00 An air traffic controller in the DFW tower observes cloud-to-ground lightning east-northeast of the airport. This lightning bolt was associated with a grey cloud and an area of rain.

5:55:00 – 6:00:00 Three airport mechanics stop to look at the storms off the north end of the runways. One later testified that the "wall of water" was the heaviest rain he had seen during his nine years at DFW.

5:56:26 Controllers notify all aircraft: "There's a little rain shower just north of the airport and they're starting to make ILS approaches. . . . "

5:58:00 The ground radar left unmanned by the meteorologist's dinner break should be indicating a VIP (Video Integration Process) level of 3 for Cell D. It was the practice of the CWSU to notify air traffic controllers of VIP level 3 storms.

Other pilots in the same area as Flight 191 note heavy storm activity on their on-board weather radars. If activated, Flight 191's on-board radar would have indicated to the cockpit crew that Cell D was an intense storm.

Cell D hovers a few hundred years off the north end of the DFW runways; Cell C, a much less intense storm – essentially just a rain-shower – lies just to the north of Cell D. If operating, Flight 191's on-board radar would have penetrated Cell C to reveal Cell D as a dangerous storm.

5:58:00 – 5:59:00 An air traffic controller at DFW informs his supervisor that he has heard thunder, assumes that there were thunderstorms outside.

5:59:43 An air traffic controller broadcasts that there is a "little bitty thunderstorm" that "looks like a little rain shower" at DFW. This controller apparently is talking about Cell C. Flight 191, tuned to a different radio frequency, misses this transmission.

5:59:47 As Flight 191 turns on its approach path, First Officer Price jokes "we're gonna get our airplane washed." Flight 191's crew can see Cell D straight ahead and to the left of them and are obviously flying close to some type of convective activity and rain.

6:00:00 An air traffic controller in the DFW tower again observes lightning to the east-northeast of the runways.

6:00:00 – 6:04:00 A pilot on the ground waiting to take off observes the worst thunderstorm he has ever seen: "It was a solid sheet or wall of water moving toward the airport with unbelievable intensity."

6:01:20 A controller repeats the general broadcast (which Flight 191 again does not hear) that "a little rain shower just popped up north of the airport." This apparently refers to Cell D.

6:02:30 Flight 191 is cleared for instrument landing on runway 17L.

6:03:31 An air traffic controller advises another Delta flight that "we're getting some variable winds out there due to a shower on short final out there north end of DFW." Flight 191 apparently hears this transmission because it is on the same frequency. An unidentified crew member of Flight 191 remarks "stuff is moving in."

6:03:32 Pilots on the ground waiting to take off see what appears to be a waterspout in the dark sky and heavy rain off the approach end of runway 17L.

6:03:58 Flight 191's Captain Connors remarks to the air traffic controller that Flight 191 "is out here in the rain, feels good."

At about the same time, the following conversation takes place between an air traffic controller in the DFW tower and the traffic control supervisor. Controller: "We've been busy with these SWAPS and hadn't paid any attention, but that is heavy, heavy rain off the approach end of both runways. . . . " The Supervisor, referring to his radar, replies "yeah, I can see that." (The district court found that these government employees were referring to Cell D and that the air traffic controller was aware of this weather situation at or before 6:03:30.)

6:04:18 The following conversation occurs in the cockpit of Flight 191.

First Officer Price: "Lightning coming out of that one."

Captain Connors: "What?"

First Officer Price: "Lightning coming out of that one."

Captain Connors: "Where?"

First Officer Price: "right ahead of us."

(At this time the aircraft is over five miles out, at an altitude between 2000 and 1500 feet.)

6:04:00 – 6:05:00 Pilots on the ground waiting to take off see what looks like a tornado off the end of the DFW runways. This phenomenon is also referred to in testimony as a wall of water, a shaft of heavy rain, a hail shaft, and a microburst. These pilots apparently also see lightning in this storm.

An aircraft immediately ahead of Flight 191 on final encounters extremely heavy rain and light-to-moderate turbulence as it lands on runway 17L.

6:05:08 Captain Connors comments "672 in the baro," thereby telling Price that he intends to go down to 200 feet and at that time will decide whether to land or execute a missed approach.

6:05:04 – 6:05:18 Flight 191's air speed suddenly increases by 20 knots, from 153 to 173 knots, because of increased headwinds as the plane enters Cell D. (See segment B-C, on appendix A "Downdraft Shear.")

6:05:19 Captain Connors recognizes air speed increase and tells Price to "watch your speed."

6:05:21 Captain Connors warns Price, "You're gonna lose it all of a sudden, there it is." Connors was referring to an impending sudden loss in airspeed that would occur when the surging

headwinds decreased. To urgent commands of "push it up, push it up, way up" by both Connors and the Second Officer, Price opens the throttle. Engine sounds increase immediately.

6:05:30 Connors states "that's it." Ground proximity alarms are sounding.

6:05:35 – 6:05:36 Flight 191, on the verge of stalling out, begins an involuntary roll to the right, even though the pilot attempts to control it. Henceforth Flight 191 is no longer attempting to land but instead is attempting a missed approach.

6:05:52 Flight 191 goes in 6,336 feet short of the runway and approximately 360 feet off-line, bounces several times and breaks up.

6:05:56 The air traffic controller instructs Flight 191 "Delta go around."

These facts are essentially undisputed.[2] Everyone agrees that the airplane crashed when it encountered an unusually strong downdraft windshear[3] in the Cell D thunderstorm. The dispute in this case, however, centers around whether the Delta flight crew or the government air traffic controllers were to blame for the airplane's entry into Cell D. The district court held: (1) the flight crew's negligence was a proximate cause of the accident, (2) Delta was not negligent in training its pilots to detect

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[2] Appellants maintain that the aircraft's on-board radar was functioning but do not attack the district court's contrary finding as clearly erroneous. Thus for our purposes the finding stands.

[3] A windshear is a sudden change in the wind's speed or direction. Appendix A explains the effect which a downdraft windshear has on an aircraft attempting to land.

and avoid windshear, (3) the Delta meteorology and flight control dispatch department was not negligent in failing to give Flight 191 updated weather information, (4) Captain Connors' negligence in flying while he was taking medication was not a proximate cause of the accident, (5) the controllers were not negligent in failing to route Flight 191 to a different runway, and (6) the air traffic controllers were negligent in not relaying weather information to Flight 191, but this negligence was not a proximate cause of the crash. The only factual findings assigned as error are (5) and the proximate cause aspect of (6).

ANALYSIS

Before entering on a discussion of appellants' points of error, it is well to remind ourselves of two basic considerations, one legal and the other factual, which bear on the case.

The first of these is the preeminent authority of the captain, the airplane commander. Although aircraft operational safety is the responsibility both of ground personnel and of the air crew, "[t]he pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft." 91.-3(a) F.A.R. On all matters drawn before the Court by this appeal – including the choice of runway and the decision whether to land or to go around – the captain of Flight 191 had the final word.

The second is that Flight 191 was in no necessity to brave the known thunderstorm over the end of the runway: fuel was ample, even to land at its alternate airport;

and, except for various discrete squalls in the area, the weather was not troublesome.

Runway Change

The foregoing principles go far to dispose of appellants' contention of clear error in the court's finding that the controllers were not negligent in failing to order Flight 191 to land on a different runway. The court correctly observed that:

> The Air Traffic Controller manual never requires that a runway be changed; it only lists criteria to be considered in contemplating a change . . . wind is the primary factor in electing to change runways . . . the ATC manual directs that, if feasible, the runway most aligned with the wind is to be used when wind velocity is greater than or equal to five knots . . . there was no wind shift before the accident.

Appellants contend that these findings are clearly erroneous, but cite no evidence countering the court's conclusions. Appellants also maintain that the district court ruled that mere compliance with the ATC manual conclusively established that the controllers had exercised ordinary care. We disagree. A fair reading of the district court's opinion shows that the court considered the handbook and ordinary controller practice as evidence of what would be ordinary care under these circumstances. The district court did not clearly err in finding that the controllers were not negligent in failing to order Flight 191 to land on a different runway. The runway in use was the one most nearly aligned with the prevailing wind; another aircraft had just landed safely on it; and, had the

aircrew of Flight 191 wished to avoid the small thunderstorm over the end of it, they had every right to break off their approach, abort the landing, and hold until the runway cleared or another more to their liking became available.

Proximate Cause

The district court held that the air traffic controllers were negligent in not transmitting to Flight 191 the following pertinent weather information that was known to the air traffic controllers before the crash:

(1) A thunderstorm was occurring off the approach end of the threshold of runway 17L.

(2) "Heavy, heavy" rain was observable from the Tower. This heavy, heavy rain was described by eyewitnesses as a wall or curtain of water, portions of which resembled a tornado.

(3) The presence of cloud to ground lightning strikes in the vicinity of the storm to the north of the field beginning as early as 5:55 p.m. and continuing up until at least shortly before the accident. At least 5 FAA employees in the Tower saw the lightning before the accident.

(4) The presence of cumulonimbus (thunderstorm) clouds, observed by the official NWS weather observer at 5:51 p.m. This observer promptly reported his sightings to the Tower personnel.

(5) Radar information showing precipitation returns on the north end of the runway.

After finding that the government air traffic controllers were negligent, however, the district court went on to hold that:

> Any failure of the air traffic controllers to warn a pilot of the presence of a storm in his path cannot be regarded as a continuing proximate cause after the pilot himself discovered its presence, appreciated the danger, and decided to fly ahead into it. *Black v. United States*, 441 F.2d 741, 745 (5th Cir.1971), *cert. denied*, 404 U.S. 913 [92 S.Ct. 233, 30 L.Ed.2d 186] (1971). The Court is of the opinion that the crew of Flight 191 possessed substantially all of the weather information potentially available from government sources. In fact, the crew was aware of additional conditions unknown by government sources, *e.g.*, windshear and lightning in Cell D. The Court considers the failure of governmental employees to pass on weather information to have been inconsequential to the fate of Flight 191 in that there is no evidence that the crew would have acted differently with this confirmation of information already known.

A. *Appellants' Arguments*

Proximate cause in Texas law consist of two elements: (1) cause in fact ("but for" causation) and (2) foreseeability. Appellants commence their argument on this head by suggesting that we may review the district court's conclusion on proximate cause *de novo*. We disagree; although the law applied by the district court is reviewable *de novo*, the court's ultimate determination of proximate cause, like a finding of negligence, is a finding of fact that is reviewable under the clearly erroneous standard only. *Pullman-Standard v. Swint*, 456 U.S. 273, 102

S.Ct. 1781, 72 L.Ed.2d 66 (1982); 53 Tex.Jr.3d, Negligence § 129.

Appellants next advance a variety of contentions that the district court applied improper law to the facts in this case:

First, appellants maintain that the district court fashioned and applied an erroneous rule of law to conclude that the controllers' negligence was not a proximate cause of the accident. Appellants argue that the *Black*[4], case, cited by the district court as support for its conclusion on proximate cause, applied Louisiana proximate cause law, which defined proximate cause as:

> the primary or moving cause . . . when negligence is established, liability attaches for all injurious consequences that flow therefrom until diverted by intervention of some efficient cause that makes the injury its own, or until force set in motion by a negligent act has so far spent itself as to be too small for the laws' notice.

They suggest that this definition of proximate cause does not allow for the possibility of multiple proximate causes of an event. Texas, on the other hand, defines proximate cause as:

> that cause which, in a natural and continuous sequence, produces an event, and without which cause such event would not have occurred. In order to be a proximate cause, the act or omission complained of must be such that

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[4] *Black v. United States*, 441 F.2d 741 (5th Cir. 1971).

> a person using ordinary care would have foreseen that the event, or similar event, might reasonably result therefrom. There may be more than one proximate cause of an event.

Appellants claim that, by following *Black*, the district court applied Louisiana's proximate cause law as of 1971, whereas the district court should have applied Texas' current proximate cause law.

They also contend that the district court, in the portion of its "Memorandum Opinion" cited at p. 1085 above, essentially held that the flight crew's negligence in not aborting the landing after they sighted lightning dead ahead and first noticed a windshear constituted a new and independent cause of the accident that broke the chain of causation from the controllers' negligence. Appellants suggest that under Texas law the crew's negligence could not constitute a new and independent cause because, in Texas, only an act or omission of some outside person or agency not a party to the lawsuit can constitute a new and independent cause.

Next, Appellants contend that the district court, in holding that the flight crew's later negligence overrode any negligence on the part of the air traffic controllers, revived the old precomparative negligence doctrines of last clear chance and discovered peril. Appellants' argument on this point arises from the district court's observation that "[a]ny failure of the Air Traffic Controllers to warn a pilot of the presence of a storm in his path cannot be regarded as a continuing proximate cause *after* the pilot himself discovered its presence, appreciated the danger and decided to fly ahead into it." (emphasis added).

Finally, appellants assert that, under the proper standard of Texas proximate cause law, it was conclusively established that the controllers' negligence was a proximate cause of the accident. They argue that the controllers' negligence was a "but for" cause of the accident if proper warnings and advice probably would have caused a reasonably prudent crew, unaware of the actual weather conditions, to avoid Cell D before entering it at 6:04:00 or to execute a missed approach before 6:05:35 p.m. Appellants argue alternatively that even if a subjective standard should be applied to the "but for" element, the actual conduct of the Delta crew indicates that they would have heeded proper warnings from the controllers.

B. *Appellants' Arguments Considered*

Appellants' most serious contention is the first set out above: that the trial court applied some law of proximate cause other than that of Texas and hence arrived at an erroneous result. We review such claims of legal error *de novo*, but a careful examination of this one leaves us unconvinced.

Almost twenty pages into the trial court's opinion, and after a most searching consideration of the facts, it turns to the law. At 720 Federal Supplement, pages 1278 and 1279, the court states clearly that the governing law is that of Texas, briefly outlining that law and referring to representative Texas authorities discussing proximate cause. The court's discussion of Texas proximate cause law alone covers over half of a printed page. The trial judge has enjoyed a long experience of the law of Texas – his native state – and it has long been the view of our

Circuit that the views of such jurists as to state law are deserving of great weight. *See Westinghouse Electric Supply Co. v. Wesley Construction Co.*, 414 F.2d 1280, 1281 n. 1 (5th Cir.1969). By a parity of reasoning we are entitled to assume a general knowledge of that law on the part of such a magistrate, certainly of its basic principles.

That there may be more than one proximate cause of an event is such a principle of the Texas (and general) law of proximate cause, and the suggestion that the experienced trial judge may have been ignorant of such a basic element of Texas tort law is a bold one indeed. The fact that further on in the opinion the court cites to *Black*, a federal case applying Louisiana law and arriving at a similar judgment on *facts* similar to those of today's case, falls far short of persuading us that the court, in the process of delivering its painstaking opinion, somehow forgot what law it was applying after having announced and expounded it in some detail. But even if that were so, which we do not concede, on this point the law of Louisiana is uncharacteristically the same in general import as the law of Texas.

Nor does the somewhat elided quotation from *Black*, borrowed by us from appellant's brief and set out above at p. 1085, do full justice to the Louisiana definition. Indeed, the language removed by appellants is all but identical to the Texas definition. We restore and emphasize it below:

> . . . The proximate cause of an injury is the primary or moving cause, *or that which, in a natural and continuous sequence, unbroken by any efficient intervening cause, produces the injury and without which the accident could not have happened,*

> *if the injury be one which might be reasonably anticipated or foreseen as a natural consequence of the wrongful act.*

Black, 441 F.2d, at 743-44.

In addition, it is and long has been the law of Louisiana that there may be more than one proximate cause of an event; indeed, this view is peculiar to neither Texas nor Louisiana law, but rather is the generally prevailing one. *Miller Car Washes, Inc. v. Crowe*, 245 So.2d 485, 495-96 (La.App.1971) (citing 65 C.J.S. 1179-83). Thus, while there may be esoteric nooks where Louisiana law of proximate cause differs from that of Texas, on the broad principles controlling here there is no significant variance; and had the trial court followed Louisiana law no harmful error would have accrued.

We take a similar view of appellants' contentions that the trial judge revived and applied the long-defunct doctrines of last clear chance and discovered peril, or viewed the aircrew's persistence in landing despite the storm as a new and independent cause of the accident. It is certainly possible to read the passages which appellants seize upon and quote in such a manner, just as it is possible to read visions of archery into a reference to an upshot. To do so, however, it would be necessary for us to assume that the court was ignorant (and uninformed by counsel) of a decade's developments in Texas tort law, a most unlikely circumstance. Instead, we understand the courts temporal references as simply observations along the way to a determination that the sole proximate cause of the catastrophe was the deliberate decision of Flight 191's experienced crew to enter Cell D, despite having observed the

tell-tale lightning that clearly marked it as a thunderstorm.[5]

Sometimes even Homer nods; and – despite the aircrew's long experience – we cannot gainsay the court's apparent view that when Flight 191 chose to fly into a thunderstorm at a low altitude and speed it chose to dice with death. The better choice is represented by the standard pilot's maxim, quoted in United States Exhibit 741: "If in doubt, get out"![6] Nor can we hold clearly erroneous the court's factfinding that telling the crew again what it already knew first-hand would have made no difference in its actions. The court's finding that the crew's deliberate decision to land through a known thunderstorm located at the end of the runway, when they could easily have gone around, was the sole proximate cause of this

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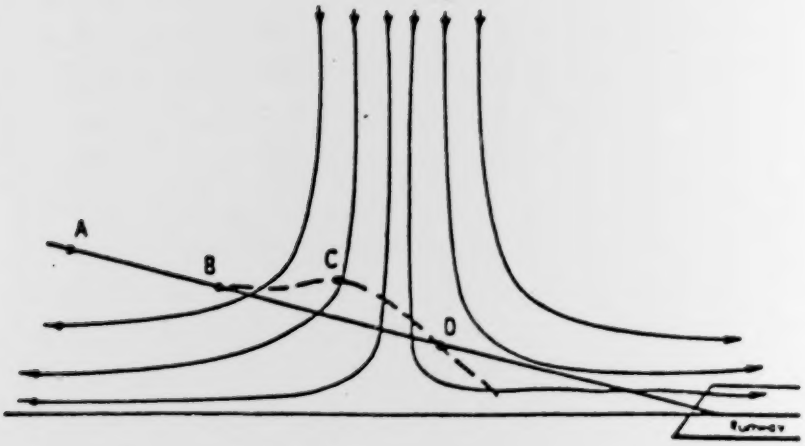
[5] In addition, the factors underlying the concepts of last clear chance and discovered peril remain fully viable today in the practical calculus of identifying causes of an event, despite the abolition of their status as formal, legal doctrine. For legal doctrine may be subject to change by judges, but reason and logic are not: Say what the court will, two and two remain four; and when we seek to identify the efficient causes of an event, phrases such as "She knew what she was getting into" and "He should have checked first to be sure it wasn't loaded" come crowding in willy-nilly.

[6] Appearing as well in another version: "There are old pilots, and there are bold pilots; but there are no old, bold pilots." Appellants attack as clearly erroneous the court's factfinding that the aircrew "possessed substantially all of the weather information potentially available from government sources." The attack is futile, however; for it is apparent, indeed undisputed, that the crew knew all of the information that the court held the traffic controllers negligent in not transmitting (listed in text at p. 1085) except the appearance of the storm as viewed from the control tower, a matter of little consequence.

disaster is not clearly erroneous; and its judgment for the United States must therefore be

AFFIRMED.[7]

APPENDIX A



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[7] This case was well-tried and superbly presented on appeal by both sides; but our study of the record makes plain that although the question whether *any* amount of cause should be attributed to the air controllers is a close one, the question whether a decision that none should be is clearly erroneous is not. Further, we take some comfort in the circumstance that, since Texas does not maintain a pure comparative negligence system, the outcomes of Mrs. Connor's and Mrs. Nassick's wrongful death actions and of Delta's claim for the value of its aircraft would not be altered unless the air controllers were found to be at least equally at fault with the aircrew – a finding which on this record would almost surely be "clearly erroneous."

DOWNDRAFT SHEAR

There is a strong downdraft in the center of the cell. There is often heavy rain in this vertical flow of air. As the vertical air flow nears the ground it turns 90 degrees and becomes a strong horizontal wind, flowing radially outward from the center. Point A represents an aircraft which has not entered the cell's flow field. The aircraft is on speed and on glide slope. At Point B the aircraft encounters an increasing headwind. Its airspeed increases, and it balloons above the glide slope. Heavy rain may begin shortly. At Point C the "moment of truth" occurs. If the pilot does not fully appreciate the situation, he may attempt to regain the glide slope and lose excess airspeed by reducing power and pushing the nose down. Then in the short span of time between Points C and D the headwind ceases, a strong downdraft is entered and a tailwind begins increasing. The engines spool down [go to idle], the airspeed drops below V.ref, and the sink rate becomes excessive. A missed approach initiated from this condition may not be successful. Note that a missed approach initiated at Point C (or sooner) would probably be successful since the aircraft is fast and high at this point. Note also that the pilot of an aircraft equipped with a groundspeed readout would see that telltale signs of a downburst cell shortly after Point B; i.e., rapidly increasing airspeed with decreasing groundspeed.[24]

UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT

No. 89-1946

D.C. Docket No. CA4 87 060 K

(Filed Jan. 9, 1991)

In re AIR CRASH AT DALLAS/FORT WORTH AIRPORT ON AUGUST 2, 1985.

Kathleen E. CONNORS, on behalf of the beneficiaries of, and as Executrix of the Estate of Edward M. Connors, Deceased, and Delta Air Lines, Inc., Plaintiffs-Appellants,

v.

UNITED STATES of America,
Defendant-Appellee.

Jean R. NASSICK, on behalf of the beneficiaries of, and as Executrix of the Estate of Nick N. Nassick, Deceased, Plaintiffs-Appellants,

v.

UNITED STATES of America,
Defendant-Appellee.

Appeal from the United States District Court for the Northern District of Texas

Before GOLDBERG, GEE and WILLIAMS, Circuit Judges.

JUDGMENT

This cause came on to be heard on the record on appeal and was argued by counsel.

ON CONSIDERATION WHEREOF, It is now here ordered and adjudged by this Court that the judgment of the District Court in this cause is affirmed.

IT IS FURTHER ORDERED that plaintiffs-appellants pay to defendant-appellee the costs on appeal to be taxed by the Clerk of this Court.

January 2, 1991

ISSUED AS MANDATE: FEB 8 1991

IN THE UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT

No. 89-1946

(Filed Jan. 29, 1991)

IN RE: AIR CRASH AT DALLAS/FORT WORTH AIRPORT ON AUGUST 2, 1985

KATHLEEN E. CONNORS, on behalf of the beneficiaries of, and as executrix of the estate of EDWARD M. CONNORS, Deceased, and DELTA AIR LINES, INC.,

Plaintiffs-Appellants,

versus

UNITED STATES OF AMERICA,

Defendant-Appellee,

* * *

JEAN R. NASSICK, on behalf of the beneficiaries of, and as executrix of the estate of NICK N. NASSICK, Deceased,

Plaintiff-Appellant,

versus

UNITED STATES OF AMERICA,

Defendant-Appellee.

Appeal from the United States District Court
for the Northern District of Texas

ON PETITION FOR REHEARING

(JANUARY 29, 1991)

Before GOLDBERG, GEE and WILLIAMS, Circuit Judges.

PER CURIAM:

IT IS ORDERED that the petition for rehearing filed in the above entitled and numbered cause be and the same is hereby DENIED.

ENTERED FOR THE COURT:

/s/ THOMAS GIBBS GEE
United States Circuit Judge

CLERK'S NOTE:

SEE FRAP AND LOCAL RULES 41 FOR STAY OF THE MANDATE.

In re AIR CRASH AT DALLAS/FORT WORTH AIRPORT ON AUGUST 2, 1985.

Kathleen CONNORS, et al.

v.

UNITED STATES of America.

MDL No. 657.
No. CA4-87-060-K, CA4-87-139-K.

United States District Court,
N.D. Texas,
Fort Worth Division.

Sept. 1, 1989.

John Martin, Thompson & Knight, Dallas, Tex., for Delta Air Lines.

Alan Wilson, Law, Snakard & Gambill, Fort Worth, Tex., for Mrs. Connors.

John Herrick, Ft. Worth, Tex., for Mrs. Nassick.

Kathlynn Fadely, Roy Krieger, Torts Branch, Civ. Div. U.S. Dept. of Justice, Washington, D.C., for U.S.

MEMORANDUM OPINION

BELEW, District Judge.

This lawsuit[1] arises out of an airplane crash that occurred at Dallas/Fort Worth International Airport

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[1] The trial, with interruptions, lasted 14 months. In addition to a large number of exhibits, there are more than 18,000

(Continued on following page)

("DFW") on August 2, 1985. At the time of the accident, the aircraft, a Lockheed L-1011-385-1, was cleared for an ILS approach[2] to Runway 17 Left (17L). The flight, identified as Delta Flight 191 (hereinafter DL 191) originated in Fort Lauderdale, Florida and was bound for Los Angeles, California, with an intermediate stop at DFW. It was equipped with a Bendix model RDR-1F monochromatic weather radar system.

At the time of the crash there were one hundred sixty-three (163) people on board – one hundred fifty-two (152) passengers and eleven (11) crew members. As a result of the crash, one hundred thirty-seven (137) people were killed – one hundred twenty-eight (128) passengers,

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(Continued from previous page)

pages of transcribed testimony. The attorneys submitted excellent briefs and indices which were highly beneficial to the Court.

[2] The Instrument Landing System (ILS) is designed to provide an approach path for exact alignment and descent of an aircraft on final approach to a runway.

The ground equipment consists of two highly directional transmitting systems and, along the approach, three (or fewer) marker beacons. The directional transmitters are known as the localizer and glide slope transmitters.

The system may be divided functionally into three parts:

(a) Guidance information – localizer, glide slope

(b) Range information – marker beacon, DME

(c) Visual information – approach lights, touchdown and centerline lights, runway lights.

eight (8) crew members, including the Captain, First Officer and Second Officer, and one (1) person on the ground.

I. STATEMENT OF THE CASE

One hundred eighty-two (182) claims were made and one hundred fifteen (115) lawsuits[3] were filed against Delta Air Lines, Inc. ("Delta") as a result of the crash of DL 191.[4]

In a separate action, Kathleen E. Connors, widow of the pilot Edward N. Connors ("Captain Conners"), and Jean R. Nassick, widow of the Second Officer, Nick Nassick, sued the United States individually and on behalf of the statutory beneficiaries under the Texas Wrongful Death Act[5] and on behalf of the estates of Connors and Nassick under the provisions of the Texas

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[3] Pursuant to 28 U.S.C. § 1407 all cases filed in various federal courts throughout the U.S. were transferred to this Court for discovery and preparation for trial.

[4] At the initial MDL organizational meeting in January, 1986, counsel for all Plaintiffs and Defendants were present and Robert Alpert, Senior Vice President and Director of Claims for U.S. Aviation Underwriters announced that anyone who wanted a trial on actual damages could have one immediately and liability would not have to be proven. He assured the attorneys that no claimant would suffer financially while awaiting trial or settlement. Liability would have to be proven in cases in which punitive damages were sought. The Court considered this gesture on behalf of Delta most commendable.

[5] Tex.Civ.Proc. & Rem. § 71.001 *et. seq.*

Survivors Act.[6] These two suits were consolidated with Delta's suit by Order of the Court. Delta joined as a Plaintiff in these suits against the United States of America alleging negligence on the part of the employees of the Federal Aviation Administration and the National Weather Service to establish liability and to recoup damages suffered by Delta as a result of the crash. These damages include money paid pursuant to settlements of personal injury and death claims[7] and judgments against it, as well as for the value of the aircraft.

On September 9, 1986, the Court granted leave to Delta to file a third-party complaint in all cases in which it had been named as a defendant. Once the consolidated pre-trial proceedings mandated by order of the Judicial Panel on Multi-District litigation was completed, Delta's third-party claims were bifurcated from all individual Plaintiff's cases. This Court retained jurisdiction over all

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[6] Captain Connors had been employed by Delta since its merger with Northeast Airlines in 1972. At the time of the accident Captain Connors had in excess of 20,000 hours of flying experience, 3,000 of which were in the Lockheed L-1011.

First Officer Rudolph P. Price, Jr. had been employed by Delta since 1970. He had accumulated 6,500 hours of flight time, of which approximately 1,200 were in the L-1011. He was flying the approach to 17L at the time of the accident. His estate did not file suit.

Second Officer Nick Nassick had been a Delta employee since 1976. Second Officer Nassick had approximately 6,500 hours of flight time, of which 4,500 were in the L-1011.

[7] Delta and the United States entered into a stipulation (filed February 26, 1988) whereby the United States would not object to any claim for contribution and/or indemnity later made by Delta on the ground that Delta was a volunteer.

the third-party claims and tried those claims with the original suit filed by Mrs. Conners, on the issue of liability alone.

At the conclusion of this trial it was estimated that the total value of claims paid and those still pending would amount to between one hundred fifty million ($150,000,000.00) and two hundred million ($200,000,000.00) dollars, including the loss of the L-1011 aircraft, valued at twenty-four million seven hundred thousand ($24,700,000.00) dollars.

II. BACKGROUND INFORMATION

A. DFW Airport

Dallas/Fort Worth International Airport is one of the largest in area and busiest with respect to landings and takeoffs in the United States. There are four principal runways that run north and south.[8] These runways are 11,388 feet in length and have a heading of 173 degrees. They are numbered according to their magnetic bearing: 17L, 17R, 18L, and 18R.[9] The innermost runways, 17R and 18L, are approximately one mile apart. The Tower, terminals, hotels, and other buildings are located between the innermost runways.

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[8] The fifth and sixth runways are considerably shorter than the four principal runways and are aligned toward the northwest/southeast.

[9] When landing from the south, these runways are numbered 35L, 35R, 36L, and 36R. The magnetic bearing is 353 degrees.

There are four points that are considered gateways to the airport. Each point, or "corner post," is about 35 miles from the ends of the runways. The corner posts are known as Blue Ridge (northeast), Scurry (southeast), Acton (southwest), and Bridgeport (northwest). Depending on the direction of arrival, planes are brought over these corner posts by the Air Route Traffic Control Center ("ARTCC") and turned over to the Terminal Radar Approach Control ("Tracon") for landing alignment and sequencing. Generally, planes coming in from the west use Acton or Bridgeport and land on runways 18L or 18R, and planes coming in from the east use Blue Ridge or Scurry and land on 17L or 17R.

B. The Federal Aviation Administration

In 1958, Congress passed the Federal Aviation Act to centralize in a single entity, the Federal Aviation Administration, the authority to make rules and regulations concerning air safety and to develop a system for the safe and efficient use of the National Airspace. In 1966, the Federal Aviation Administration (FAA) was placed in the Department of Transportation.

Pursuant to its responsibilities under the Act, the FAA divided the continental United States and the airspace above into twenty (20) contiguous regions. Within each region is an Air Route Traffic Control Center (ARTCC). The Fort Worth ARTCC covers parts of five (5) states: Oklahoma, Texas, Arkansas, Louisiana, and New Mexico.

(1) *The Air Route Traffic Control Center*

The ARTCC is staffed by Air Traffic Controllers[10] who utilize radar and radio communications to

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[10] The Air Traffic Control Handbook (Delta Ex. 5) states that in providing air traffic control services the controllers shall:

2-2 DUTY PRIORITY

a. Give first priority to separating aircraft and issuing safety advisories as required in this handbook. Good judgment shall be used in prioritizing all other provisions of this handbook based on the requirements of the situation at hand.

2-2a Note. Because there are many variables involved, it is virtually impossible to develop a standard list of duty priorities that would apply uniformly to every conceivable situation. Each set of circumstances must be evaluated on its own merit and when more than one action is required, the controller shall exercise his best judgment based on the facts and circumstances known to him. That action which is most critical from a safety standpoint is performed first.

b. Provide additional services to the extent possible, contingent only upon higher priority duties and other factors including limitations of radar, volume of traffic, frequency congestion, and workload.

2-2b Note. The primary purpose of the ATC system is to prevent a collision between aircraft operating in the system and to organize and expedite the flow of traffic. In addition to its primary function, the ATC system has the capability to provide (with certain limitations) additional services. The ability to provide additional services is limited by

(Continued on following page)

coordinate and regulate the flights of all airborne craft within the region. The radar and communications systems are extremely elaborate and sophisticated.[11] Also assigned to the ARTCC is the Central Weather Service Unit ("CWSU") which aids the controllers in the dissemination of weather information to pilots in the region.

(2) *Tracon*

ARTCC controllers are responsible for bringing the planes bound for DFW to a corner post approximately thirty-five (35) miles from the airport, at which point the planes are turned over to the Tracon controllers. These controllers are located on the ground floor of the Tower at DFW. It is their responsibility to sequence, or align and

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(Continued from previous page)

many factors, such as the volume of traffic, frequency congestion, quality of radar, controller workload, higher priority duties, and the pure physical inability to scan and detect those situations that fall in this category. It is recognized that these services cannot be provided in cases in which the provision of services is precluded by the above factors. Consistent with the aforementioned conditions, controllers shall provide additional service procedures to the extent permitted by higher priority duties and other circumstances. The provision of additional services is not optional on the part of the controller, but rather is required when the work situation permits.

[11] Each plane is depicted on the radar screen as a data block which includes the flight number, speed, altitude, and other information about the particular plane. The numbers making up the data block move across the screen as the plane moves.

space, the planes in an orderly fashion for landing. Tracon then turns the planes over to the Tower controllers as they begin their final approach seven (7) to ten (10) miles from touchdown or landing on the assigned runway.

(3) *The Tower*

Controllers in the Tower use radar, visual sightings, and verbal communication to provide air traffic control services and weather information to aircraft arriving at and departing from DFW. Once an airplane is "passed off" from Tracon to the Tower, the tower controller directs the final approach, landing, and taxi. The Tower is located in the area between runways 17R and 18L and is about equal distance (approximately one mile) from either end of the runways.

C. Weather Facilities

After the Weather Bureau was abolished in 1965, the National Oceanic and Atmospheric Administration (NOAA) was created as the administrative head of the various weather agencies and transferred with other weather related entities to the Department of Commerce. The organizational name of the Weather Bureau was changed to the National Weather Service ("NWS"). 15 U.S.C. § 311, *et seq.*

The NWS provides the aviation community with a variety of services from a number of different facilities. These services include general forecasting, issuance of warnings and advisories, consultations, and briefings.[12]

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[12] Delta Ex. 86.

NWS personnel do not communicate with pilots. Their role for aviation interests is to create weather information products for relay to FAA facilities, Air Traffic Controllers, airlines, and other such users.

(1) *The Central Weather Service Unit*

Following an air crash in 1977, the National Transportation Safety Board ("NTSB") recommended to the FAA that immediate action be taken for the development and implementation of a system for controllers to relay severe thunderstorm and tornado bulletins to aircraft in an airport terminal area. The FAA was urged to:

> formulate rules and procedures for the timely dissemination by air traffic controllers of all available severe weather information to inbound and outbound flight crews in the terminal area.[13]

Following this pronouncement, the Department of Transportation/FAA and the NOAA/NWS entered into an agreement in 1980[14] whereby the NWS would operate CWSU's at each ARTCC. In order to implement this agreement for the Fort Worth Center, the NWS installed a radar facility at Stephenville, Texas ("SEP"), 72 miles from DFW Airport. The CWSU is located in the ARTCC building just south of DFW. The CWSU receives its radar image from SEP. The image received by CWSU is two minutes old due to the time it takes for the information to be translated into digital form, transmitted by phone lines, and retranslated.

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[13] Delta Ex. 79.

[14] Delta Ex. 23.

The primary function of the CWSU at Fort Worth ARTCC is to provide weather information to air traffic controllers and staff, including ATC's in the ARTCC, Tracon, and Tower. The CWSU meteorologists do not communicate with the pilots, but pass the weather information to the ATC's in the form of briefings and forecasts. After the information is received from the meteorologist or weather coordinator, the ATC's disseminate it to the pilots.

The Weather Coordinator ("WC") functions as an interface between the NWS meteorologist and the Air Traffic Controllers. The WC is primarily responsible for the inter/intrafacility disseminations of Sigmets,[15] CWA's[16] and urgent Pireps.[17] WC's also provide assistance in the collection and dissemination of other significant weather information.

(2) *The Weather Service Forecast Office*

Responsibility for weather forecasting is divided into fifty geographic areas. There is roughly one forecast office for each state, although larger states, such as Texas, have more than one office. The Weather Service Forecast Office ("WSFO") in Fort Worth is located in the Federal Building in downtown Fort Worth.

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[15] Significant Meteorological Information (covers severe weather).

[16] Central Weather Advisory (an unscheduled weather advisory regarding conditions currently existing).

[17] Pilot Report.

The principal function of the WSFO is to provide general weather forecasts. The WSFO also performs specialized services for the aviation community. It provides a forecast for a particular airport, or "terminal forecast," which generally addresses weather conditions affecting airport ground functions. The WSFO also issues TWEBS (Transcribed En Route Weather Broadcasts), describing weather conditions along the most frequently flown routes across North Texas. A third type of forecast is given for International Travel.

(3) *Weather Service Contract Meteorological Office*

The Weather Service Contract Meteorological Office ("WSCMO") is located on the second level of the Delta hanger at DFW Airport in space leased from Delta. The observer makes visual surface weather observations each hour and relays such observations electronically to various NWS and FAA facilities. The observer notes cloud conditions, precipitation, temperature, dew point, wind, etc. If conditions warrant (*i.e.*, weather deteriorates), the observer may make a special weather observation. The observer was functioning as an independent contractor on August 2, 1985.[18]

D. Weather

(1) *Radar*

Precipitation is the only weather observable by radar. Detectable precipitation appears as an image on a radar

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[18] See Opinion entered Nov. 5, 1987.

screen and is measured by Video Integration Processor (VIP) levels. These indices reflect the level of intensity of precipitation from VIP 1 (lowest) to VIP 6 (highest). Radar measures only the intensity of precipitation and does not measure the intensity of the winds, turbulence, etc. in the echo.[19] It is sometimes difficult for a meteorologist to determine whether the radar echo is precipitation, ground clutter, or anomalous propagation. Anomalous propagation is caused by atmospheric conditions other than precipitation.

(2) *Downbursts*

Thunderstorms can produce a downburst, or strong downdraft inducing an outburst of damaging winds on or near the ground, as occurred at DFW on the day of the crash. The downburst consists of the downdraft and its outflow. It originates from a convective storm.[20] Initially, an updraft forms due to the local heating of the terrain. When the updraft reaches condensation level, it cools and a cloud forms. If the cloud continues to grow, the air goes higher and higher, and all of the water vapor in the air condenses out. Finally, the water comes rushing down out of the cloud. The cold air associated with the downburst produces a very intense downdraft that comes down with the rain and, when it gets near the ground,

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[19] Duke, Vol. 46, pp. 82-85 (references are to volumes of trial transcript).

[20] A Convective storm results from the rising and falling of air due to temperature. Hildebrand, Vol. 95, pp. 101, 102, 103 (Deft. Ex. 518).

spreads out horizontally and causes an outflow of air in different directions.

Downbursts are subdivided into macrobursts and microbursts according to the horizontal scale of damaging winds. A macroburst is a large downburst with its outburst winds extending in excess of 4 Km. (2.5 miles) in horizontal dimension. An intense macroburst often causes widespread, tornado-type damage. Damaging winds can be as high as 134 miles per hour. A microburst is a small downburst with its outburst and damaging winds extending only 4 Km. (2.5 miles or less). In spite of its small horizontal scale, an intense microburst can induce damaging winds as high as 168 miles per hour.[21]

Clouds producing downbursts are formed by convective activity. One type of such conductive cloud is the cumulus[22] cloud, generally appearing puffy with a flat base. They range in size from small clouds to large thunderstorms with damaging winds and hail and lightning within.

(3) *Wind shear and Advisory Circular AC 00-50A*

Wind shear is best described as a change in wind direction and/or speed in a very short distance. For

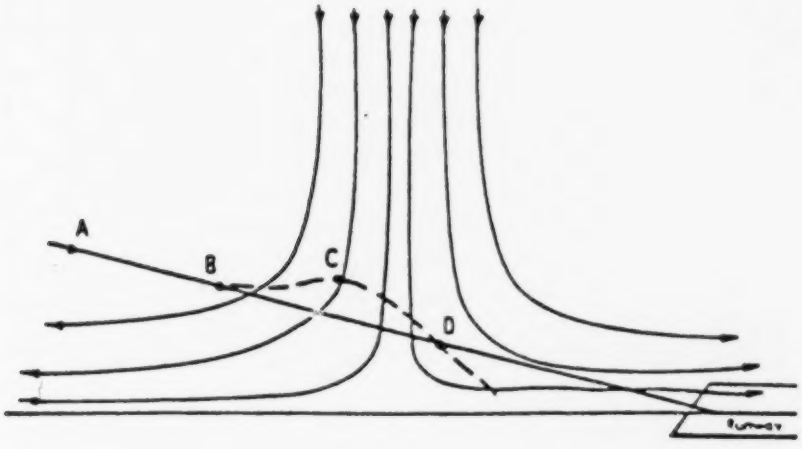
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[21] Fujita, The Downburst, p. 8; U.S. Ex. 518.

[22] A cumulus cloud is one in the form of individual detached domes or towers which are usually dense and well defined. It develops vertically in the form of rising mounds of which the bulging upper part often resembles a cauliflower. The sunlit parts of these clouds are mostly brilliant white, and their bases are relatively dark and nearly horizontal. U.S. Exhibit 619, p. 146.

example, if the wind changes from a 30 knot headwind to a 30 knot tailwind, the result is a 60 knot shear. There are several general categories of wind shear, such as frontal wind shears and downdrafts. DL 191 was confronted with wind shear emanating from a downdraft or downburst.

Advisory Circular AC 00-50A[23] gives an excellent description and explanation of the classic thunderstorm "downburst cell" which is as follows:



[23] Delta Exhibit 3.

DOWNDRAFT SHEAR

> There is a strong downdraft in the center of the cell. There is often heavy rain in this vertical flow of air. As the vertical air flow nears the ground it turns 90 degrees and becomes a strong horizontal wind, flowing radially outward from the center. Point A represents an aircraft which has not entered the cell's flow field. The aircraft is on speed and on glide slope. At Point B the aircraft encounters an increasing headwind. Its airspeed increases, and it balloons above the glide slope. Heavy rain may begin shortly. At Point C the "moment of truth" occurs. If the pilot does not fully appreciate the situation, he may attempt to regain the glide slope and lose excess airspeed by reducing power and pushing the nose down. Then in the short span of time between Points C and D the headwind ceases, a strong downdraft is entered and a tailwind begins increasing. The engines spool down [go to idle], the airspeed drops below V.ref, and the sink rate becomes excessive. A missed approach initiated from this condition may not be successful. Note that a missed approach initiated at Point C (or sooner) would probably be successful since the aircraft is fast and high at this point. Note also that the pilot of an aircraft equipped with a groundspeed readout would see the telltale signs of a downburst cell shortly after Point B; i.e., rapidly increasing airspeed with decreasing groundspeed.[24]

This advisory further provides that "[i]f the airplane is below 500 feet AGL and the approach becomes unstable a go-around should be initiated immediately.

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[24] Advisory Circular AC 00-50A at 8.

Airspeed fluctuations, sink rate, and glide slope deviation should be assessed as part of this decision."[25]

Dr. Fujita points out that an accident during the final approach can occur when an aircraft attempts to land through a strong microburst located on the glide slope near the approach end of a runway. In nearly all cases, an aircraft first experiences a headwind increase while entering a shower or virga. As a result, the aircraft gains altitude. When the pilot brings the aircraft altitude down to the glide slope, downflow and a tailwind are awaiting the aircraft. Unless full power is applied early enough to regain the altitude, the airplane could continue its rapid descent to the ground.[26]

III. THE SEQUENCE OF EVENTS

A. Overview

After crossing the Blue Ridge corner post at 5:52:09[27] Central Daylight Time ("C.D.T.") and heading southwest for landing at DFW, the crew of DL 191 saw building cumulus clouds north and northeast of DFW. They had a view of the airport where the sun was shining. As they approached, there were at least two cumulus clouds in the area. One of these clouds had been there for some

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[25] *Id.* at 14.

[26] Exhibit 518, Dr. Fujita – The Downburst, pp. 33, 34.

[27] There are three general forms of time: Greenwich Mean Time or Zulu, twenty-four hour time, and standard form. Time references in this opinion will be made in standard form post meridian.

time, developing over the outer marker.[28] This cell[29] has been referred to in the litigation as Cell C. South of and between Cell C and the north end of Runway 17L there was a second cumulus cloud evidencing more rapid development. This cloud became Cell D, the cell from which the microburst descended.

When DL 191 approached DFW it was vectored to the north (downwind leg), west (base leg), and then south (final). When the aircraft was put on final approach, rain was visible between the aircraft and Cell D. At that point it was possible to see the airport, but as the rain increased the airport went out of view.[30]

ATIS[31] Romeo had been issued at 4:47 and DL 191 received the following report at 5:35:33:

> Weather six thousand scattered,[32] two one thousand scattered, visibility one zero, temperature one zero one, dewpoint six seven, wind calm altimeter two niner niner two, runway one eight right one seven left, visual approaches in progress.

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[28] An outer marker is an electronic device associated with the ILS located about five (5) miles North of the runway.

[29] A cell is the updraft and downdraft portion of the cloud.

[30] Haggard, Vol. 1, pp. 75, 76.

[31] Automatic Terminal Information Service. ATIS reports give pilots certain landing and weather information in a brief, repeating format. Each ATIS is described by a letter; for example, ATIS Romeo would be followed by ATIS Sierra.

[32] Scattered – a sky cover of clouds less than 50%. Broken – a sky cover of clouds more than 50%.

Persons at various locations at the airport were able to see the whether deteriorate. Mr. Del Prete, the WSCMO weather observer, completed observations during which he saw cumulonimbus[33] clouds to the north and northeast, blanketing the entire sky to the north, northeast at 5:51.

Personnel in Tracon were aware of thunder and the Tower's auxiliary generators were activated as a precaution. A Tracon controller had received a Pirep from a plane flying east through Cell D to the effect that it was difficult to hear over the rain. DL 191, however, was not on the frequency. Others on the ground watched the storm develop. It appeared to one observer to be a bad thunderstorm, a wall or curtain of water. The tower controller saw moderate rain progress to "heavy, heavy rain."

A controller notified all aircraft that there was a little rainshower just north of the airport, apparently referring to Cell C. There were observations of lightning in the west and northeast by persons in the Tower and on the ground.

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33. A cumulonimbus cloud is a cumuliform cloud type. It is heavy and dense, with considerable vertical extent in the form of massive towers; it often has tops in the shape of an anvil or massive plume. Under the base of cumulonimbus, which is often very dark, there frequently exists virga, precipitation, and low, ragged clouds (scud), which may or may not be merged with it. This cloud is frequently accompanied by lightning, thunder, and sometimes hail. It occasionally produces a tornado or a waterspout, which is the ultimate, manifestation of the growth of a cumulus cloud, occasionally extending well into the stratosphere. U.S. Exhibit 619, p. 145.

In eight minutes, Cell D developed from a VIP 2 to a VIP 4. Since the storm was near the airport, SEP called the WFSO to advise them of its apparent severity. The WSFO was aware that a thunderstorm existed north of DFW airport.

As DL 191 was coming in to land it lost its altitude and made contact with the ground in a plowed field about 360 feet east of the extended center line of runway 17L and 6336 feet north of the runway threshold. The plane was in a wings level, nose high altitude, and on a heading of about 167 degrees magnetic. Following the initial impact, the plane ascended, went a short distance, and hit the ground again. After this second impact the plane continued, traversing Highway 114, striking a car and killing the occupant. The plane then proceeded toward two water tanks about 1700 feet beyond the highway. The airplane grazed the north tank and struck the south water tank about 3195 feet beyond the initial touchdown point, breaking apart. The plane made four separate and distinct ground contacts before breaking up and coming to a stop. There was no evidence of pre-impact separation or failure; the damage to the plane was caused entirely by the impact with the ground and subsequent structures.[34] Upon examination after the accident, it was noted that the thrust reversers had been deployed on

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[34] Fujita, *DFW Microburst*. (Delta Exhibit 517) T. Theodore Fujita is a noted meteorologist at the University of Chicago. The technical information contained in this Opinion was obtained by visual inspection of the area and from the Digital Flight Data Recorder, the so-called "black box."

each of the three engines, all of which were located in the tail section of the airplane.

B. Arrival Sequence

From 5:48:15 to 6:03:25 fifteen planes landed at DFW on Runways 17L and 17R. Immediately prior to the attempted landing of DL 191, one of these fifteen planes had to go around due to ground traffic, and two landed on 17R. The remainder landed on 17L.

Reports from the landing crews are varied. Some experienced little weather; others were in heavy rain inside the outer marker. The learjet, the last plane to land before DL 191, entered rain shortly after passing the outer marker. It then encountered heavy rain at 6:04 and exited heavy rain about one mile to 1½ miles from the threshold of 17L. No crew, except DL 191, saw lightning coming out of Cell D.

Approximately twelve planes had taxied down the taxiways in preparation for takeoff on 17L or 17R. As they were waiting at the north end of the taxiway for entrance onto 17L or 17R, they were in an excellent position to see Cell D. These planes were approximately one mile north of the Tower. Specific observations will be discussed in the following section of this opinion.

C. Specific Chronology

The following is a chronology of the most significant events which took place during the flight of DL 191. All of the following times are stated in Central Daylight Time, August 2, 1985.

Time	Event
5:03:59	Fort Worth ARTCC Controller told DL 191 to expect Blue Ridge arrival.[35]
5:09:18	Fort Worth ARTCC attempted to give DL 191 vectors towards Scurry VOR.[36]
5:09:35	Captain Connors, in response to the foregoing ATC direction, asked, "How's the weather over Scurry?"[37]
5:10:53	Internal discussion between two controllers at Fort Worth ARTCC during which the PAXTO controller acknowledged with respect to the attempt to send DL 191 into an area of weather, "He didn't want no part of it."[38]
5:11:16	Fort Worth Center controller for Texarkana Sector directed DL 191[39] to "expect a further clearance direct to Scurry." Captain Connors replied, "So we've been told, okay, sure looks better over Blue Ridge though. Weather looks better over Blue Ridge."[40]
5:11:36	After being told by the controller that the traffic doesn't look very good over Blue Ridge, Captain

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[35] Delta Exhibit 468B, Shreveport High Manual Tab, p. 4; see also flight track of aircraft during this portion of flight, Delta Exhibit 700.

[36] Delta Exhibit 468B, Shreveport High Manual Tab, p. 8.

[37] Delta Exhibit 468B, Shreveport High Manual Tab, p. 8.

[38] Delta Exhibit 468B, Shreveport High Manual Tab, p. 9.

[39] While the controller mistakenly said "American 191," it is obvious from reading the transmissions that he was talking to Delta Flight 191.

[40] Delta Exhibit 468B, Texarkana High Radar Tab, p. 2.

Connors stated: "I'd rather wait for an airplane than, uh, go fight a bunch of weather."[41]

5:12:26 After being told to go into a holding pattern south of Texarkana for 30 minutes,[42] Captain Connors responded, "Okay, we appreciate that, it sure looks a lot better that way, it looks kind of crummy down there at Scurry. . . . "

5:25:00 Richard Douglass, CWSU Meteorologist, left his post to take a dinner break.

5:35:26 Flight Engineer received ATIS Romeo which bore a time of 4:47 and contained the following weather information: "Weather six thousand scattered, two one thousand scattered, visibility one zero, temperature one zero one, dewpoint six seven, wind calm altimeter two niner niner two runway one eight right one seven left, visual approaches in progress."

5:43:56 Captain Connors told Fort Worth Center, "I'm looking at a cell at about heading of two five five and it's a pretty good size cell and I'd rather not go through it I'd rather go around it one way or the other."[43] Reference was to the so-called "Blue Ridge thunderstorms."

5:45:00 Al Magazzine, a DFW Airport employee in Tower Cab for purposes of traffic count, noticed a build-up of clouds towards Las Colinas, a community northeast of DFW.[44]

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[41] Delta Exhibit 468B, Texarkana High Radar Tab, p. 2. See also, Delta Exhibit 700.

[42] Delta Exhibit 468B, Texarkana High Radar Tab, p. 3 – reference to "three zero".

[43] Delta Exhibit 469.

[44] Magazzine, Vol. 8, p. 5.

5:49:00 Cell D first appeared on Oklahoma city radar, and would have appeared on Stephenville radar at approximately the same time.[45]

5:50:00 Jack Williams observed Cell C in northwest corner of Dallas County within 10 miles of DFW Airport.[46]

5:50:50 American 351 announced its intention to go around.[47] American 351 then commenced go-around and later made a second approach, despite an FAA Inspector in the cockpit jump-seat having observed lightning during first approach.[48]

5:51:00 Del Prete (NWS Airport Weather Observer) completed observation during which he saw cumulonimbus clouds to the north-northeast, blanketing the entire sky to the north and northeast.[49]

5:51:19 Second Officer Nassick observed, "Looks like it's raining over Fort Worth"; an unknown voice commented " . . . Dallas."[50]

5:52:00 Radar photos confirmed the existence of Cell D on Stephenville radar as a VIP level 1.[51]

DL 191 was at 11,500 feet and pointed straight at Cells C and D. These returns would likely have appeared clearly on DL 191's radar. As the flight descended from Blue Ridge, there

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[45] Haggard, Vol. 1, pp. 99, 173, 181.

[46] Williams, Vol. 16, pp. 105-107.

[47] Delta Exhibit 468A, LCE Tab, p. 48.

[48] U.S. Exhibit 404A.

[49] Del Prete, Vol. 36, pp. 159-160, 163; Delta Exhibit 172.

[50] Delta Exhibit 469.

[51] Haggard, Vol. 1, pp. 99, 184.

would have been good radar returns from cells C and D until the aircraft turned northbound at approximately 6:00.[52]

5:52:08 Captain Connors made radio contact with DFW Approach Control. He was talking with Feeder East Controller Robert Hubbert.[53] At the time of this initial contact, DL 191 was approximately over the Blue Ridge VOR, which is approximately 35 miles northeast of the airport, and was at an altitude of 11,100 feet MSL.[54]

5:54:00 Tollenaar, Captain of Metro 1756, encountered light rain just south of Lewisville, which he was in for approximately one mile;[55] the area of rain was fairly confined and clearly discernable.[56] Tollenaar was able to see 17L during his entire approach, including while flying in the rain.[57] Tollenaar painted a cell without difficulty; it was a red area, which is a contouring area, surrounded by a thin yellow area indicating a steep gradient.[58] Tollenaar testified that he would not have flown through what his radar was painting; he would have executed a missed approach.[59]

5:55:00 Tower controller Ferguson observed from the Tower Cab a cloud-to-ground bolt of lightning

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[52] Leech, Vol 85, p. 120; Manningham, Vol. 107, pp. 151, 153-154.

[53] Delta Exhibit 469; Delta Exhibit 468-A.

[54] Delta Exhibit 635-A.

[55] Tollenaar, Vol. 93, pp. 127-128; Hildebrand, Vol. 96, pp. 125-126.

[56] Tollenaar, Vol. 93, pp. 128-129.

[57] Tollenaar, Vol. 93, p. 128.

[58] Tollenaar, vol. 93, p. 130; Hildebrand, Vol. 96, p. 126.

[59] Tollenaar, Vol. 93, p. 131.

to the east-northeast associated with the gray cloud and area of rain.[60]

5:55:00 – 6:00:00 Lee Ankerson, walked outside and joined two other mechanics. The three of them watched the storm develop. Ankerson says it "was big and it looked real bad."[61] He said it "looked like a bad thunderstorm."[62] He said it looked like a "wall of water," "a curtain," and the heaviest rain he had seen during his nine years at DFW.[63]

5:56:00 Since 5:52, Cell D had become a VIP 3, was quite pronounced, and was growing quite rapidly north of DFW. Cell D had enlarged on radar imaging five or six times its size at 5:52.[64]

At this time DL 191 was 17 to 18 miles from Cell D and could have scanned up to at least 32,000 feet with its radar, allowing it to see whatever weather Stephenville was painting.[65] Both cells could have contoured on airborne radar. The aircraft was pointed directly toward the cells.

5:56:26 Feeder East Radar Controller Hubbert notified all aircraft: "There's a little rain shower just north of the airport and they're starting to make ILS approaches. . . . "[66] Hubbert testified

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[60] Ferguson, Vol. 8, pp. 157-158.

[61] Ankerson, Vol. 92, p. 173.

[62] Ankerson, Vol. 92, p. 174.

[63] Ankerson, Vol. 92, p. 175.

[64] Haggard, Vol. 1, pp. 105, 184; Vol. 2, p. 44.

[65] Gwinn, Vol. 31, pp. 91-94; Manningham, Vol. 107, pp. 157-158 (up to 37,000 feet and down to the ground).

[66] Delta Exhibit 468A. Feeder East tab, p. 50.

that he was talking about a weather area located in the position now identified as Cell C.[67]

5:58:00 Before going on break at 5:59, Jim Brecheen, an Air Traffic Assistant in the Tower Cab, saw one flash or bolt of cloud-to-ground lightning in the proximity of the rain to the northeast of the Tower.[68]

Even with two-minute delay, CWSU radar would have displayed VIP 3 intensity of Cell D by 5:58. It was the practice of the CWSU to notify Tracon of a VIP 3.[69]

Dixon, Captain of Cessna 340, with his radar on the 10 mile range, observed an intense echo with a very heavy rainfall gradient;[70] these observations had to be Cell D, and it was contouring and had a sharp gradient; Dixon was at 1,000 feet and was using a much wider radar beam than DL 191's, and even with his less capable radar Dixon had no problem depicting a contouring cell.[71] Dixon was within a couple of miles of DL 191's location at this time.[72]

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[67] Delta Exhibit 708; Hubbert, Vol. 52, pp. 30, 43-44.

[68] Brecheen, Vol. 8, pp. 200-202.

[69] Paup, Vol. 16, pp. 31, 37; Delta Exhibit 220, a memo from Jack Paup, requires such a notification: "DFW TRACON is the only FAA facility outside of the Center that we brief on a routine basis. However, the CWSU has the responsibility of notifying approach facilities of weather that will affect normal operations. This function is normally performed by a telephone call from the Meteorologist."

[70] Dixon, Vol. 82, pp. 134, 138-140, 152; U.S. Exhibit 751.

[71] Hildebrand, Vol. 96, pp. 137-140.

[72] *Id.*

While Dixon was making his radar observations, DL 191 was pointed straight at the cell and these cells remained directly ahead of it for the next 2 minutes; the crew should have been able to see Cell D contouring on radar almost straight ahead, slightly to the right, at a range of 10-15 miles; Cell C would have been 30 degrees to the right and smaller, not contouring.[73] DL 191 was at 5,800 feet AGL, considerably higher than Dixon, so 191 should have had less problem with ground clutter. The cells Dixon painted unquestionably were within the tilt range of DL 191's radar at this time.[74] As DL 191 approached the airport, its radar would have gone through Cell C and show Cell D.[75] Cell C would not have shadowed or blocked the view of Cell D.[76]

According to CWSU Chief Meteorologist Paup, between 5:52 and 6:06, radar information about the VIP level of Cell D was available to the CWSU but was not communicated because Douglass was not at his post. Paup also acknowledged that the CWSU can help

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[73] U.S. Exhibit 732-A-6; Hildebrand, Vol. 96, pp. 141-143; Manningham, Vol. 107, pp. 164-165 (Cell D at this time was a level 3 or higher).

[74] Hildebrand, Vol. 96, pp. 145-146; Manningham, Vol. 107, pp. 164-165 (at this point the scanning height of DL 191's radar was at least 20,000 feet, so 191 could scan everything SEP could, and could see the entire vertical profile of the cells); U.S. Exhibit 732-A-6.

[75] Hildebrand, Vol. 96, p. 53.

[76] Manningham, Vol. 107, p. 155. This section is not intended to be a comprehensive list of what was on various aircrafts' radar. The evidence clearly establishes that nearly every aircraft with its radar on and operating properly obtained contours before the accident. See Summary of Aircraft Radar Observations previously submitted.

pilots avoid thunderstorms by providing this type of information.[77]

5:58:00 – 5:59:00 According to his own testimony, controller Tarbet informed supervisor Joe Connors about hearing thunder during this time period. Tarbet assumed there was possibly a thunderstorm going on outside.[78]

5:59:43 Feeder East Controller Hubbert referred to "little bitty thunderstorm" that "looks like a little rain shower." Hubbert was talking about a cell in the location of Cell C.[79] (*Note*: DL 191 did not hear this transmission.)

5:59:47 As DL 191 turned back to the north, Price said, "We're gonna get our airplane washed"[80] referring to a visual observation by Price.[81] Price was looking forward and could see something coming out of the base of the cloud.[82] At this time Delta Flight 963 was seeing the bowlshaped cloud outside the outer marker and they anticipated flying through it. DL 191 was flying almost due west and could see Cell D straight ahead and to the left of them.[83] DL 191 was at 5,000 feet, and just about to turn right to 340 degrees. They obviously were flying close to some type of

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[77] Paup, 16 pp. 3, 5, 25, 37, 39, 43, 44, 81-83. See also Krantz, Vol. 26, pp. 30-32 (importance of CWSU information to ATC).

[78] Tarbet, Vol. 8, p. 138.

[79] Hubbert, Vol. 52, pp. 43-44; Delta Exhibit 708; Delta Exhibit 468(a), Feeder East Tab, p. 53.

[80] Delta Exhibit 469.

[81] Hildebrand, Vol. 96, p. 142.

[82] Hildebrand, Vol. 96, p. 160.

[83] U.S. Exhibit 732-A-1; Hildebrand, Vol. 96, p. 160.

convective activity and rain.[84] The First Officer was pointing out that they were going to be flying through some rain, and it is likely he was expecting a fair amount of rain.

6:00:00 NWS Stephenville Weather Radar Operator Encinas observed "a small thunderstorm cell."[85] He referred to it as "a rapidly developing thunderstorm."[86] Encinas acknowledged that a storm that developed from VIP 2 to VIP 4 in eight minutes (such as Cell D) would have strong convective activity.[87] Encinas observed Cell D as having a pinpoint VIP 4 intensity.[88]

VIP 4 echo indicated the "probability" of a thunderstorm, according to Richard Douglass.[89] According to the testimony of Paup, Chief Meteorologist at the CWSU and Mr. Douglass' immediate supervisor, there is a correlation with level 4 returns and thunderstorm activity, and the CWSU would report a VIP 4 intensity to the Tracon (not just the presence of an echo). The CWSU Meteorologist, had he been at his post, could have seen that the thunderstorm was in the vicinity of the airport to the north of the DFW Airport.

FAA Air Traffic Assistant Barbara Foe observed lightning to the east-northeast from the FAA Tower Cab.[90]

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[84] Leech, Vol. 85, pp. 118-119.

[85] Duke, Vol. 48, pp. 148-152.

[86] Duke, Vol. 48, p. 154.

[87] Duke, Vol. 48, p. 155.

[88] Haggard, Vol. 2, pp. 56-61; Duke, Vol. 48, p. 151.

[89] Duke, Vol. 48, p. 24.

[90] Foe, Vol. 8, pp. 219-222.

6:00:13 Feeder East Controller Hubbert observed a "little rain shower" just north of the airport. This transmission was not heard by DL 191, because it was not on the frequency.

6:00:33 AR-1 Controller asked American Flight 351, "Do you see the airport yet?" American 351 First Officer Patrick Davis replied, "As soon as we break out of this rain shower we will." DL 191 heard this transmission.

During American 351's second approach, FAA Inspector Neumeier, a licensed air transport pilot, again sighted lightning. Neumeier took no action to prevent the flight from continuing, nor did he suggest or order it to execute a missed approach or to make a Pirep.[91]

6:00:00 – 6:04:00 Captain Sam Toler, Piedmont Flight 70, saw from DFW a large sheet of water emanating from an intense thunderstorm. Captain Toler testified that it was the worst thunderstorm he had ever seen: It was a solid sheet or wall of water moving toward the airport with unbelievable intensity.[92]

6:01:00 Bill Glen, a Department of Public Safety employee, observed from DFW cloud-to-cloud lightning north of the airport all the way across each runway approximately five minutes before the accident.[93]

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[91] U.S. Exhibit 404A; Alger, Vol. 111, p. 191; Manningham, Vol 108, pp. 82-84.

[92] Toler, Vol. 12, pp. 28-30.

[93] Glenn, Vol. 8, pp. 119-121, 129-130.

Mike Porter, an FAA Local Control West Controller in the Tower Cab, observed two lightning strikes to the west of the area of weather, and another lightning strike to the east-northeast[94] where Cell D was located.

Encinas called Fort Worth WSFO to alert them that there was a thunderstorm over DFW. Encinas believed that the storm was of consequence because it was located near an airport. He reported a pinpoint VIP 4 cell with a top of 40,000 feet.[95]

By this time, Williams, of the Fort Worth WSFO, acknowledged that he knew that a thunderstorm existed over the town of Coppell, Texas, which is located immediately to the north of Runway 17L at DFW Airport.[96]

Del Prete observed lightning to the north-northeast of DFW.[97]

First Officer Chris Robbins, Delta Flight 1051, observed from DFW a cloud developing rapidly, which was, in his words "billowing, boiling, exploding." There was dark, heavy rain and a bamboo curtain effect one-half to one mile from the end of the runway, which appeared to be a thunderstorm. The easternmost part of the cloud was right off 17L.[98]

6:01:20 Feeder East Controller Hubbert transmitted that a "little rain shower just popped up north

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[94] Porter, Vol. 59, pp. 110-111.

[95] Delta Exhibit 228; Duke, Vol. 48, pp. 11, 156; Williams, Vol. 16, pp. 108, 126-127.

[96] Williams, Vol. 16, pp. 131-132; Duke, Vol. 48, p. 23.

[97] Del Prete, Vol. 36, pp. 187-188.

[98] Robbins, Vol. 9, pp. 82-87.

of the airport." DL 191 was not on the frequency.[99] This return was in the area of Cell D.[100]

6:02:00 The United States claims that a conversation between Tarbet and Joe Connors regarding thunder occurred at about 6:02. Thus, Joe Connors was aware of thunder by no later than 6:02.[101]

Al Magazzine, a DFW Airport employee in the Tower Cab, observed a thunderstorm consisting of a heavy dark area of precipitation to the north end of the Runway 17 complex.[102]

Del Prete heard thunder[103] and associated the rainshower with the thunderstorm.[104] After the accident, Del Prete told Jeff Brown, "Conditions at least should have prompted concern among air traffic controllers."[105]

6:02:30 DL 191 was advised that they were 6 miles from the outer marker. They were requested to turn left heading 180 to join the localizer at or above 2,300 feet, and they were cleared for the ILS 17 Left approach. This was acknowledged by Captain Connors at 6:02:43: "Delta one-niner-one Roger, all that appreciated."[106]

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[99] Hubbert, Vol. 52, p. 42; Delta Exhibit 468A, Feeder East Tab, p. 54; Delta Exhibit 708.

[100] Hubbert, Vol. 52, pp. 43-44; Delta Exhibit 708.

[101] Beaudoin, Vol. 40, pp. 82, 87; McDermott, Vol. 11, p. 78.

[102] Magazzine, Vol. 8, pp. 6-7, 10.

[103] Del Prete, Vol 36, p. 187

[104] Del Prete, Vol 36, pp. 188-191.

[105] Brown depo. Joint Exhibit 5, pp. 19, 32.

[106] Delta Exhibit 469.

The rain should have contoured on DL 191's radar; they were on base leg just south of Lewisville (a small city east of DFW) heading west. The radar would have been showing the crew that if they flew ahead for a mile or two and then turned left toward the airport, they would be turning toward a contouring cell. At this time, Dixon was seeing a contouring cell and other pilots were seeing red cells.[107] With their radar tilted up 7 degrees the crew could have interrogated the whole base of the cloud. Even if they had the bottom of the beam parallel to the ground they would have seen rain beneath the cloud.[108]

6:03:04 Tracon received a Pirep from Southwest Flight 99 (not heard by DL 191) that it was hard to hear in the rain he was in.[109] At this time, Southwest Flight 99 was inside Cell D, approximately 1½ miles from the end of Runway 17L, at an altitude between 6,300 feet and 6,900 feet.[110] The Pirep was not disseminated by Tracon to pilots or to other controllers.[111]

6:03:06 DL 191 was approximately 8 miles north of the threshold of 17L at 2,800 feet. At this time, the north side of the microburst was about 2.5 miles north of the end of the runway and it was above the surface at some altitude; therefore, DL 191 was between 5 and 6 miles from

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[107] U.S. Exhibit 732-A-6; Hildebrand, Vol. 97, pp. 12-13.

[108] U.S. Exhibit 732-A-7; Hildebrand, Vol. 97, pp. 13-14.

[109] Delta Exhibit 468A, Feeder East Tab, p. 55; Hubbert, Vol. 52, pp. 3-4.

[110] Delta Exhibits 635Z-1 and 635Z-2.

[111] Hubbert, Vol. 52, pp. 4-5.

the microburst.[112] Under Dr. Fujita's analysis, DL 191 was then at an altitude of less than 1,000 feet and below the altitude of the microburst. The microburst likely was directly ahead of the aircraft, and at the same altitude, when the crew turned final.[113] Thus, the microburst would have been within the tilt range capability of DL 191's radar. DL 191's radar had the ability to scan up to 15 degrees, meaning at this distance from Cell D it could scan about 8,600 feet above the altitude of the aircraft. The microburst would have been straight ahead of the airplane at that time, enabling the crew to scan it with the beam parallel to the surface of the earth; that is, the radar operator would not have had to tilt up the radar to see the microburst.[114] Rain falling from Cell C at this time would not have attenuated the radar signal and a good display of Cell D would still be on DL 191's radar scope. This factual finding was also made by the NTSB, which found there would have been a radar display up to two miles to the cell.[115] The DFW microburst itself (Cell D), as opposed to precipitation associated with Cell C, might have caused a ground shadow on DL 191's radar before they penetrated the cell whether or not the radar was adjusted properly. Nonetheless, even if DL 191's radar beam had been fully attenuated and a radar shadow

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[112] Hildebrand, Vol. 96, pp. 19-27; Manningham, Vol. 107, pp. 175-176; U.S. Exhibit 732-A-1.

[113] Hildebrand, Vol. 96, pp. 19-27; U.S. Exhibit 732-A-1, 732-A-5, 732-A-7.

[114] Hildebrand, Vol. 96, pp. 26-27.

[115] Manningham, Vol. 107, pp. 175-176; see also U.S. Exhibit 732-A-6.

were present, this should have not have misled the crew into flying into the microburst.[116]

6:03:20 Skipworth, the Local East Controller in the Tower Cab who took control of DL 191 inbound from outer marker, saw moderate rain progress to heavy rain when the Learjet was four or five miles final. He described it as "a definite wall of rain."[117]

6:03:31 AR-1 Controller advised Delta Flight 557 that "we're getting some variable winds out there due to a shower on short final out there north end of DFW." DL 191 was on frequency, so it should have heard the transmission. An unidentified crewmember of DL 191 remarked "stuff is moving in . . . . "[118]

6:03:32 Captain Joe Coughlin and First Officer Dave Davis of DL 963 saw from DFW what appeared to be a water spout.[119] Both observed dark sky and heavy rain off the approach end of 17L and two bright shining parallel phenomena extending to the ground.[120]

6:03:58 Captain Connors called Controller Skipworth and said that DL 191 is "out here in the rain, feels good." This rain was so light it could not be seen by other aircraft 6 to 8 miles away;[121] further, it is implausible that DL 191 was in rain so heavy that the crew could not see

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[116] Hildebrand, Vol. 96, pp. 35-36.

[117] Skipworth, Vol. 25, p. 127.

[118] Delta Exhibit 469.

[119] U.S.Exhibit 145.

[120] Dave Davis, Vol. 5, p. 131; Coughlin, Vol. 91, pp. 196-197.

[121] Hildebrand, Vol. 97, pp. 65-66, 93.

forward.[122] DL 191 was in rain from the time Captain Connors said "out here in the rain feels good" until they entered the microburst. The intensity of this rain was very light; two aircraft that were not far off could not see any rain, and the Learjet, which immediately preceded, and American 539, which immediately followed, reported that they did not enter any precipitation until they got down to about the point where DL 191 entered the rain shaft;[123] the only possibility is that some very light rain came down between these two airplanes, because no one else could see it;[124] it was not enough to seriously impair 191's ability to see where they were going. If there had been enough rain to impair their ability to see forward, other aircraft would have been able to see it.[125] Light rain does not negate forward visibility in an airplane.[126]

At approximately the same instant, the following conversation occurred between Kennedy (Tower Cab) and Joe Connors (Tracon Supervisor):

"We've been busy with these SWAPS and hadn't paid any attention, but that is heavy, heavy rain off the approach end of both runways . . . . "

Joe Connors, referring to his radar, replied to the Tower:

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[122] Hildebrand, Vol. 97, pp. 61-67, 97.

[123] Hildebrand, Vol. 97, p. 101; Manningham, Vol. 108, pp. 16-17.

[124] Hildebrand, Vol. 97, p. 102; see also Hildebrand, Vol. 97, pp. 61-67.

[125] Hildebrand, Vol. 97, p. 104.

[126] Manningham, Vol. 108, pp. 3-4.

Yeah, I can see that."[127]

Joe Connors' reply referred to Cell D, which was a solid area about two miles in width, two miles north of the airport.[128]

Because of the time it took for Kennedy to answer Joe Connors' call, it is clear that Kennedy actually observed the heavy, heavy rain at or before 6:03:30.[129]

6:03:58 Joe Connors earlier had seen a speckled area on the radar in the vicinity of the outer marker (presumably Cell C);[130] by this time he saw a solid area (Cell D) about two miles wide and about two miles north of the airport.[131]

6:04:00 Hildebrand, Fujita and others concluded that the microburst impacted the ground very close to 6:04, maybe as early as about 6:03:30 or 6:30:35, but not significantly later; at 6:04, the rain shaft was on the ground and the Learjet's encounter confirms this fact.[132] Based on the observations of American 351 of the area in which they entered heavy rain, and other pilot observations and witness statements, bounds can be placed on the descent of the microburst. The 6:04 timing of impact is accurate

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[127] Delta Exhibit 469; Delta Exhibit 468A, Interphone Tower/TRACON Tab, p. 6.

[128] Delta Exhibit 205; Haggard, Vol. 1, pp. 116-118, McDermott, Vol. 10, p. 67.

[129] Hensley, Vol. 55, pp. 156-157, 176-177; McDermott, Vol. 10, pp. 66-67, Vol. 14, pp. 64, 65.

[130] Beaudoin, Vol. 40, p. 87.

[131] Delta Exhibit 205; Wayson, Vol. 53, pp. 115-116; Beaudoin, Vol. 40, p. 88 and Vol. 43, pp. 150, 137; McDermott, Vol. 10, p. 67; Wayson, Vol. 53, p. 113.

[132] Hildebrand, Vol. 96, pp. 3-4; U.S. Exhibit 733-Q.

and consistent with these pilot observations. Furthermore, the pilot observations confirm that the location of the impact was a little over 2 miles out.[133]

According to the data, there were a number of rain shafts that descended from the cloud base at different times; there was some light rain that descended from the cloud prior to the microburst. The microburst itself started descending some time after 6:00, probably about 6:01, although it may have started descending slightly later if it fell at a higher rate, but certainly no later than about 6:02.[134]

The Stephenville radar bisected Cell D at about 17,000 feet down to some altitude below the cloud base. In doing so, SEP radar measured a VIP 3 level echo and then at 6:04 saw a VIP 4. Thus, between 6000 feet and 17,000 feet there was a sufficient amount of rain for the SEP radar to see.[135]

The base of the clouds in the DFW area was 6000 feet. This figure is based upon pilot observations, the fact that the temperature from DL 191's DFDR showed a temperature inversion between 6000 and 7000 feet, additional information from ground observers, the Roxbury photos which confirmed the 6000 feet base, and Dr. Fujita's conclusion that the bases were 6000 feet.[136]

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[133] U.S. Exhibit 728-A; Hildebrand, Vol. 96, pp. 16-18.

[134] Hildebrand, Vol. 96, p. 4.

[135] Hildebrand, Vol. 96, pp. 5-7.

[136] Hildebrand, Vol. 95, pp. 183-187, Vol. 96, p. 4; U.S. Exhibit 131.

Specifically, the bases of Cells C and D were both about 6000 feet.[137]

The microburst descended at a rate between 2000 fpm and maybe 3000 fpm. It exited from the base of the cloud at around 6:01 and hit the ground at 6:04 traveling 6000 feet in three minutes (2000 fpm). Dr. Fujita plotted the microburst descent at about 3500 feet or so in the minute between 6:03 and 6:04; extrapolating from that figure, the microburst exited the cloud base at 6:02. Dr. Fujita has the microburst traveling the 6000 feet from the base of the cloud to the ground in two minutes (3000 fpm). It is more likely that the descent rate was 2000 fpm based upon looking at peak vertical velocities of the winds measured by DL 191 as it flew through the microburst, which were about 3000 fpm. The maximum velocity of the microburst downward would be higher than the velocity of the progression of the microburst toward the ground because the microburst had to push all this air out of the way as it fell down toward the ground. It is not possible to determine the exact descent rate, but between 2000 and 3000 fpm is scientifically sound.[138]

6:04:18 First Officer Price: "Lightning coming out of that one."

Captain Connors: "What?"

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[137] Hildebrand, Vol. 95, pp. 183, 192; Del Prete, Vol. 36, p. 161; U.S. Exhibit 324.

[138] Hildebrand, Vol. 96, pp. 14-15. A determination of the descent rate of the microburst is necessary to locate the water within the cloud. The location of the water in turn determines whether Cell D would have contoured on DL 191's radar as the aircraft approached from Blue Ridge.

First Officer Price: "Lightning coming out of that one."

Captain Connors: "Where?"

First Officer Price: "Right ahead of us."[139]

DL 191 had entered and been in the rain continuously since at least 6:03:58,[140] until after initial impact. DL 191 was already inside the rain falling out of Cell D at this time, and hence in the thunderstorm, at the time of the First Officer's sighting of the lightning.

The First Officer made a very clear statement that he saw lightning. He unambiguously stated that he saw it out of "that one," meaning a specifically identifiable piece of weather.[141] At this time, Price clearly was looking forward and saw lightning coming out of "that one ahead of us." The lightning came from a rain shaft in Cell D.[142] They did not penetrate that rain shaft until approximately a minute later, when Captain Connors said "watch your speed" at 6:05:17 and commented "wash that off a bit" at 6:05:05.[143]

6:04:30 The "lightning coming out of that one" exchange was followed by 7 seconds of silence. When Captain Connors made no response, Second Officer Nassick responded at 6:04:30, "you get good legs don't ya."[144]

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[139] Delta Exhibit 469.

[140] The parties stipulated to this fact. Vol. 97, pp. 99-100.

[141] Bolman, Vol. 70, p. 51.

[142] Hildebrand, Vol. 97, p. 37.

[143] Hildebrand, Vol. 97, p. 105.

[144] Delta Exhibit 469.

Second Officer Nassick's comment was not a casual cockpit comment.[145] His reference to "good legs" was to legs of the trip,[146] as it was the practice at Delta that the Captain and First Officer alternate flying legs.[147]

Second Officer Nassick was concerned and was pointing out a deteriorating situation and poor flying conditions.[148]

6:04:00 – 6:05:00 Eastern Airlines Flight 654, Captain Al Stanley, saw from DFW what appeared to be a tornado, Captain Stanley described the rain as a wall of water or a sheet or shaft of heavy rain. The Co-pilot of Eastern 654 called it a "hail shaft," and the Flight Engineer referred to it as a "microburst." Captain Stanley saw one or two lightning strikes in the right side of the rain before observing the tornado. The storm he observed undoubtedly was a thunderstorm.[149]

After encountering extremely heavy rain and light to moderate turbulence, the Captain of the Learjet, Lewis, added an extra 25 knots to his approach speed;[150] he also decided to fly his approach high and not go all the way to minimums because of the weather he had encountered.[151]

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[145] Bolman, Vol. 70, pp. 64-65.

[146] Hildebrand, Vol. 97, p. 36.

[147] Smith, Vol. 71, p. 197.

[148] Leech, Vol. 85, p. 137; Manningham, Vol. 107, p. 192; Bolman, Vol. 70, pp. 64-65; Hildebrand, Vol. 97, p. 36.

[149] Stanley, Vol. 12, pp. 7-9.

[150] Lewis, Vol. 6, pp. 34, 35.

[151] Lewis, Vol. 6, p. 35.

Captain Lewis admitted that while he was flying his approach he had his hands full;[152] these observations are consistent with Hildebrand's microburst descent rate and times.[153]

As he was turning inbound (6:03:36 – 6:04:26), Captain Dobson of American 539 was able to see DL 191.[154] American 539 was cleared for the approach 7 miles from the outer marker and was in visual meteorological conditions, with at least 3 miles of forward visibility.[155] There was no rainshower in front of Dobson, except the one just off the runway;[156] Dobson did not see a second rain shaft at any point during his approach.[157] Dobson did not encounter any rain until he executed his go-around and actually penetrated the cloud that was generating the storm.[158]

Dobson neither saw nor encountered any other rain shaft that would have prevented him from seeing the one that was just north of 17L.[159] Dobson testified that there were no other cells producing lightning at 6:04:18 when Price commented about lightning on the DL 191 CVR.[160]

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[152] Lewis, Vol. 6, p. 12.

[153] Hildebrand, Vol. 96, p. 28.

[154] Dobson, Vol. 17, pp. 11, 12, 38, 47; Hildebrand, Vol. 97, p. 18; U.S. Exhibit 732-A-3.

[155] Dobson, Vol. 17, pp. 45-46; Hildebrand, Vol. 97, p. 34.

[156] Dobson, Vol. 17, p. 47; Hildebrand, Vol. 97, pp. 29-30.

[157] Dobson, Vol. 17, p. 74.

[158] Dobson, Vol. 17, pp. 50-51.

[159] Dobson, Vol. 17, p. 51.

[160] Dobson, Vol. 17, p. 82.

Dobson was not in rain when he got to the location where 191 said "out here in the rain feels good."[161]

6:05:00 Robertson was flying an Aero Commander northeast of the storm at this time looking south at the weather.[162] Robertson was bothered by DL 191 approaching this weather, thus he watched the aircraft continuously as it entered and then exited the rain.[163] He was bothered because of the storm's intensity and location; Robertson could not say exactly why, but he did say he expected to be wrong about his caution and thought he would see DL 191 roll out into the bright sunshine, but of course 191 did not.[164] Robertson actually witnessed DL 191 penetrate the rain shaft.[165] At the time DL 191 flew into the rain shaft, Robertson said that the "storm had such a defined edge, there was no gradual thing going into it, it was so defined that if you entered the storm, if you froze the frame right there you could see the forward half of the aircraft was obscured, back half of the aircraft was in bright sunshine; I mean it was just that quick."[166] Robertson indicated that there was nothing to the north of the storm that would have prevented DL 191 from seeing it.[167]

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[161] Hildebrand, Vol. 97, p. 30.

[162] Robertson, Vol. 37, pp. 92, 97.

[163] Robertson, Vol. 37, pp. 93-94; Hildebrand, Vol. 97, pp. 40-41.

[164] Robertson, Vol. 37, pp. 93-94; Hildebrand, Vol. 97, p. 55.

[165] Robertson, Vol. 37, p. 94.

[166] Robertson, Vol. 37, p. 95; Hildebrand, Vol. 97, p. 55.

[167] Robertson, Vol. 37, pp. 90-91, 93; Hildebrand, Vol. 97, p. 41.

6:05:05 DL 191, on glideslope, passed 1,000 feet AC[168]According to Delta procedure, the flight is supposed to be stabilized below 1,000 feet.[169] At 6:05:08, Captain Connors commented, "762 in the baro."[170] This was an indication to First Officer Price that Captain Connors intended to go down to 200 feet, which is the decision height for the approach, and at that time he would decide whether they would land or execute a missed approach.[171] When he advised Price of this, it told First Officer Price that they were going to continue down to 200 feet and then make a decision on whether to execute a missed approach. The Captain announced this decision height after First Officer Price had advised of "lightning right ahead of them coming out of that one."[172]

6:05:04-6:05:18 DL 191's airspeed increased from 153 to 173 knots.

6:05:19 Captain Connors recognized the airspeed increase by stating, "Watch your speed."[173]

6:05:20 Sound of intense rain can be heard on CVR.

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[168] U.S. Exhibit 469. See also Delta Exhibit 517, Fujita book, *DFW Microburst on August 2, 1985,* p. 80, column labeled Z – Zlst (feet).

[169] U.S. Exhibit 32-A (POM).

[170] Delta Exhibit 469.

[171] The altitude of 200 feet is derived from subtracting the published runway altitude of 562 feet from the stated barometric altitude of 762 feet.

[172] Leech, Vol. 85, p. 140, Vol. 85, pp. 141-142, Vol. 87, pp. 89-90; Manningham, Vol. 107, p. 194.

[173] Delta Exhibit 469.

6:05:21 DL 191 continued descending along the final approach course toward the area of developing weather. At 6:05:21, the Captain warned the First Officer, "You're gonna lose it all of a sudden, there it is." To exhortations of "push it up, push it up, way up" by both the Captain and the Second Officer, the First Officer added airspeed.

6:05:28 Delta experienced a performance loss (wind shear) of 44 knots.

6:05:30 Eleven seconds after Captain Connors noted the airspeed increase at 6:05:19, he stated, "That's it."

6:05:35 Sound of microphone keying from DL 191's air-to-ground radio.[174]

6:05:35-6:05:36 Upon encountering a descending and violent vortex, the first of the three multiple vortices encountered by DL 191, the aircraft began experiencing a roll to the right of at least 22 degrees[175] even though the pilot attempted to control the roll by using full left aileron input.[176]

6:05:36 From this point forward, the crew of DL 191 was no longer attempting to land the aircraft on that approach but was attempting to perform what some people call an escape maneuver, a go-around, or a missed approach. Others have characterized it as simply trying to fly the aircraft and avoid ground impact.

6:05:52 Initial touchdown while DL 191 was still in heavy rain.

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[174] Delta Exhibit 469.

[175] Bautz, Vol 3, p. 28; Bray, Vol. 73, p. 72; Mullins, Vol. 109, p. 107, 113; Brady, Vol. 19, pp. 78-79.

[176] Bautz, Vol. 3, p. 28; Brady, Vol. 19, p. 79.

6:05:56 Gene Skipworth instructs Delta Flight 191: "Delta go around."[177]

IV. APPLICABLE LAW

1. These actions are brought pursuant to the Federal Tort Claims Act, 28 U.S.C. § 2671 *et seq.*

2. Jurisdiction and venue properly lie with this Court under 28 U.S.C. § 1346(b) and 28 U.S.C. § 1402(b), respectively.

3. Texas law applies to determine the rights and liabilities of the parties. 28 U.S.C. § 2674. *Richards v. United States,* 369 U.S. 1, 82 S.Ct. 585, 7 L.Ed.2d 492 (1962). *Brooks v. United States,* 695 F.2d 984 (5th Cir.1983). See Opinion filed by this Court on September 22, 1986.

4. Parties who asserted that the air traffic controller's negligent conduct was a substantial cause of crash of aircraft during landing have the burden of persuasion. *Delta Air Lines, Inc. v. U.S.,* 561 F.2d 381 (1st Cir.1977).

5. Under Texas law, liability of the United States for negligence allegedly causing an aircraft accident is to be determined by the ordinary rules of negligence and due care. *American Airlines, Inc. v. United States,* 418 F.2d 180, 191 (5th Cir.1969); *United States v. Schultetus,* 277 F.2d 322, 325 (5th Cir.1960), *cert. denied,* 364 U.S. 828, 81 S.Ct. 67, 5 L.Ed.2d 56 (1960); *Associated Aviation Underwriters v. United States,* 462 F.Supp. 674, 681 (N.D.Tex.1978); *Brooks v. United States,* 695 F.2d 984 (5th Cir.1983).

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[177] Delta Exhibit 469.

6. Under Texas law, a plaintiff has the burden of establishing each of three essential elements of actionable negligence. The elements are as follows: (1) a legal duty owed by one person to another; (2) a breach of that duty; and (3) damages proximately resulting from such breach. *Atchison, Topeka & Santa Fe Ry. v. Standard,* 696 S.W.2d 476, 478 (Tex.App.1985); *Gray v. Baker and Taylor Drilling Co.,* 602 S.W.2d 64, 65 (Tex.Civ.App.1980); *Abalos v. Oil Development Co.,* 544 S.W.2d 627, 631 (Tex.1976).

7. Whether or not a legal duty exists under a given set of facts is essentially a question of law to be determined by the Court. *Gray v. Baker and Taylor Drilling Co.,* 602 S.W.2d 64, 65 (Tex.Civ.App.1980); *Abalos v. Oil Development Co.,* 544 S.W.2d 627, 631-633 (Tex.1976).

8. Under Texas law, proximate cause includes two elements: (1) cause in fact, and (2) foreseeability. *Williams v. Steves Industries, Inc.,* 699 S.W.2d 570, 575 (Tex.1985); *Nixon v. Mr. Property Management Co.,* 690 S.W.2d 546, 549 (Tex.1985).

9. Cause in fact is established if the injury would not have occurred "but for" the act or omission. *Harrison v. Harrison,* 597 S.W.2d 477, 484 (Tex.Civ.App.1980); *Biggers v. Continental Bus System,* 157 Tex. 351, 303 S.W.2d 359, 365 (1957); *Hopson v. Gulf Oil Corp.,* 150 Tex. 1, 237 S.W.2d 352, 355 (1951). Texas courts use the term "substantial factor" in the context of the "but for" requirement; that is, if a negligent act or omission is a substantial factor in bringing about the injury or without which no harm would have occurred, the act or omission is a cause in fact of the injury. *See Nixon v. Mr. Property Management Corp.,* 690 S.W.2d 546, 549 (Tex.1985).

10. The foreseeability requirement under Texas law requires that the injury be of such a general character as might reasonably have been anticipated, and that the injured party should be so situated with relation to the wrongful act that injury to him or to one similarly situated might reasonably have been foreseen. *Harrison v. Harrison*, 597 S.W.2d 477, 484 (Tex.Civ.App.–Tyler, 1980); *Motsenbocker v. Wyatt*, 369 S.W.2d 319, 323 (Tex.1963).

11. Under Texas law proximate cause cannot be established by mere guess or conjecture; it must be proven by evidence of probative force. *McClure v. Allied Stores of Texas, Inc.*, 608 S.W.2d 901, 903 (Tex.1980). *See also, Moorhead v. Mitsubishi Aircraft Int'l, Inc.*, 828 F.2d 278, 283 n. 24 (5th Cir.1987).

12. Though falling below requisite standard of care, an act or omission is not actionable unless also shown to be a substantial cause of complained of injury. *Delta Air Lines v. U.S.*, 561 F.2d 381.

V. DELTA LIABILITY

A. Crew Responsibility

1. It is well-established that the pilot-in-command of an aircraft is directly responsible for, and is the sole authority as to, the operation of that aircraft. 14 C.F.R. § 91.3; *Carney v. United States*, 634 F.Supp. 648, 652 (S.D.Miss.1986), *aff'd*, 813 F.2d 405 (5th Cir.1987); *See also, Moorhead v. Mitsubishi Aircraft Int'l., Inc.*, 828 F.2d 278, 285 (5th Cir.1987); *American Airlines, Inc. v. United States*, 418 F.2d 180, 191-92 (5th Cir.1969); *Associated Aviation Underwriters v. United States*, 462 F.Supp. 674, 681 (N.D.Tex.1978).

2. The duties of the pilot and of the controllers are concurrent. However, the operational control of the aircraft is not assigned to air traffic control; this is assigned to the air carrier and the pilot-in-command. 14 C.F.R. § 121.537; *Baker v. United States*, 417 F.Supp. 471, 485 (W.D. Wash.1975).

3. Pilots of all commercial passenger-carrying planes have a specific obligation to fully apprise themselves of prevailing and expected weather conditions along the route of their flights. *In re Air Crash Disaster at Boston, Mass., July 31, 1973*, 412 F.Supp. 959, 968 (D.Mass.1976), *aff'd sub nom Delta Air Lines, Inc. v. United States*, 561 F.2d 381 (1st Cir.1977), *cert. denied*, 434 U.S. 1064, 98 S.Ct. 1238, 55 L.Ed.2d 764 (1978).

4. The pilot has a continuing duty to be aware of danger when he can gather adequate information with his own eyes and instruments; a pilot cannot disregard the weather conditions he sees around him. *Moorhead v. Mitsubishi Aircraft Int'l Inc.*, 828 F.2d 278, 285 (5th Cir.1987); *Spaulding v. United States*, 455 F.2d 222, 226-27 (9th Cir.1972) (applying Texas law); *Peters v. United States*, 596 F.Supp. 889, 895 (E.D.Pa.1984) (a pilot cannot ignore the weather information he has been given or disregard the weather conditions he sees around him).

5. Where dangerous weather conditions are clearly visible or known, a pilot should recognize them through his mandatory weather training and is obligated to look out for and avoid these weather conditions. *Associated Aviation Underwriters v. United States*, 462 F.Supp. 674, 681 (N.D.Tex.1978); *Black v. United States*, 441 F.2d 741, 743

(5th Cir.1971), *cert. denied*, 404 U.S. 913, 92 S.Ct. 233, 30 L.Ed.2d 186 (1971).

6. The crew of an airline transport is required to conduct its operations pursuant to applicable regulations, good operating practices, and the procedures imposed by the airline itself. *Baker v. United States*, 417 F.Supp. 471, 483 (W.D.Wash. 1975).

7. Delta's Flight Operations Procedures Manual contains a notation regarding the use of radar in thunderstorm conditions. This notation states that thunderstorm conditions should be avoided whenever possible. If early evasive action is not practicable, the manual indicates that certain practices should be followed:

> Avoid areas where sharp changes in rainfall intensity occur, any echoes which are rapidly changing in shape, size, or intensity, or any echoes which have prominent scallops, hooks or fingers by at least:
>
> –5 miles at 10,000 feet or below.

These clearances are predicated on using the 50 or 100-mile range on the L-1011's airborne weather radar. The manual further states that weak echoes or areas of weak rainfall gradient may be flown through or adjacent to "if judgment dictates this to be the most desirable procedure."

8. It is negligence on the pilot's part to land or take off in an obvious thunderstorm. *Spaulding v. United States*, 455 F.2d 222, 227 (9th Cir.1972) (applying Texas law); *Neff v. United States*, 420 F.2d 115, 116 (D.C.Cir.1969), *cert. denied*, 397 U.S. 1066, 90 S.Ct. 1500, 25 L.Ed.2d 687 (1970).

9. A pilot who is not certain as to the presence of a wind shear nevertheless may be negligent in flying too close to thunderstorm activity even if he does not penetrate the thunderstorm cell itself. *McKinney v. Air Venture Corp.*, 578 S.W.2d 849, 859-60 (Tex.Civ.App.1979).

Flying into the thunderstorm

10. Prior to departure from Ft. Lauderdale, Delta's Flight Control Dispatch and Meteorology Department provided the flight crew of DL 191 with a routine dispatch package. This package contained the following weather documents: the reported weather at DFW Airport and at the flight's alternate destination, San Antonio; a terminal weather forecast for DFW indicating widely scattered moderate rainshowers and thunderstorms with moderate rainshowers; an en route forecast indicating isolated thunderstorms, moderate rainshowers over Oklahoma and northern and northeastern Texas with a few isolated tops above 45,000 feet; and Delta Metro Alerts applicable to the route of flight, one of which stated that an area of thunderstorms was expected over Northern and Northeastern Texas. These forecasts were prepared by Delta Meteorologists. These forecasts advised the flight crew of DL 191 that the atmosphere around the DFW airport was unstable and capable of producing an airmass thunderstorm.[178]

11. As noted, the flight crew received ATIS Romeo at 5:35:26 containing weather information including the temperature (101), and dewpoint (67).

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[178] U.S. Exhibit 406.

12. By 5:51:19, the flight crew was aware of rain over the DFW area as indicated by comments on the CVR:[179] "Looks like it's raining over Ft. Worth."

13. At 5:56:28, the Feeder East controller broadcast to all airplanes that "there's a little rainshower just north of the airport and they're starting to make ILS approaches. . . . " DL 191 was on the frequency and its flight crew heard this transmission.

14. At 5:59:37, DL 191 was about seven miles northeast of the storm and was requested to turn right at 340 degrees. Between 5:51 and 6:00, the microburst-producing cell (Cell D) had intensified from VIP 1 to VIP 4; the nose of the aircraft was pointed southwest toward this cell until 5:59:37. Except for a period between 5:55:53 and 5:57:19, during which a prelanding checklist was completed, the flight crew was relatively free of in-cockpit duties. During this period the flight crew would have been free to use the weather radar to observe Cell D and to manipulate the antenna tilt to analyze the storm structure and intensity. Since the storm cell had reached a VIP 4 by 6:00[180], the cell would have contoured on their radar during this period.

15. By 5:59:47, with the statement by the First Officer, "we're gonna get our airplane washed," the Captain's reply, "What?" and the First Officer repeating the statement, it was apparent to the flight crew of DL 191 that their flight path would take them through the area of rain

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[179] Cockpit voice recorder: a device that records all intracockpit conversation.

[180] Duke, vol. 46, pp. 63-64.

about which they had been advised and which they had observed. The Comment by Second Officer Nassick regarding Price "getting good legs" was an acknowledgment that flying conditions were not optimal.

16. At 5:59:54, the flight crew of DL 191 switched to Arrival Radar-1 frequency and contacted the Arrival controller.

17. At 6:00:36, the Arrival Radar-1 controller asked American Flight 351, two aircraft in front of DL 191, if it was able to see the airport. The flight crew replied, "As soon as we break out of this rainshower we will." This transmission was overheard by the flight crew of DL 191, and they thus were aware that the rainshower they were to encounter was of sufficient intensity to obscure forward vision by pilots of landing aircraft.

18. At 6:02:35, DL 191 was cleared for the ILS approach to Runway 17L.

19. At 6:03:30, the controller broadcast: "and we're getting some variable winds out there due to a shower on short final out there north end of DFW." This transmission was overheard by the flight crew of DL 191 who thus were aware of variable winds associated with the rainshower located between them and the airport.

20. At 6:03:34, the deteriorating weather conditions caused a member of DL 191's flight crew to remark, "Stuff is moving in. . . . "

21. By 6:03:58, DL 191 had begun to encounter rain, as confirmed by the Captain's report upon initial contact with the Tower: "Tower, DL 191 heavy, out here in the rain, feels good."

22. At 6:04:01, DFW Tower cleared DL 191 to land and advised of winds 090 degrees at 5 knots, gusts to 15.

24. Prior to 6:04:18, the First Officer observed lightning coming out of Cell D, and reported to the Captain, "Lightning coming out of that one." When asked by the Captain, "what?" the First Officer repeated his observation. When asked by the Captain, "Where?" the First Officer stated the location to be "Right ahead of us." Since the aircraft was already in Cell D,[181] this language indicates that the First Officer was able to see a rain shaft from Cell D directly in their path, that it was emitting lightning and that the flight crew still had sufficient forward visibility to make that observation until encountering intense rain at 6:05:20.

25. Lightning is a reliable indicator of a thunderstorm.[182]

26. At no time during the final approach did the flight crew of DL 191 ask for information on weather conditions from any one of several sources available to them. This is significant not because such information would have caused the crew to discontinue the approach; indeed, the crew already had the information warranting a decision to forego landing. Rather, the crew's failure to solicit additional weather information evidences an

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[181] At 6:04:00, the plane was transitioning from cell C to Cell D in light rain. Haggard, vol. 1, p. 119, vol. 2, p. 100.

[182] Hildebrand, Vol. 95, pp. 133-134; Duke, Vol. 45 p. 134, Vol. 48 pp. 152-153, 176, 183; McCarthy, Vol. 103, p. 39, Vol. 104 p. 37; Haggard, Vol. 2 p. 86.

unreasonable disregard for risk of landing in unstable weather.

27. Building cumulus clouds are convective clouds which can easily and very quickly become thunderstorms. Even without the presence of intense rain, lightning or thunder, pilots know they represent a potential hazard and should be avoided.

28. It was common knowledge in the industry that there is the potential for a microburst within any convective activity or thunderstorm.[183] The presence of building cumulus clouds and the heavy rainshowers should have alerted the crew to the possibility of a microburt.[184]

29. Delta pilots are taught never to fly into the area of a cell depicted by a contour on airborne weather radar. Delta pilots are taught that wind shear and microbursts are associated with thunderstorms.[185]

30. Microbursts are so rapid in development and transient in duration that two airplanes, one following another through the same area, often observe and experience entirely different events. It was therefore unreasonable for the crew to rely on the absence of Pireps from other planes in deciding to continue the approach.

31. Other airplanes scanned the storm at very close range using their radar sets near the time of the accident. All of these airplanes' radars painted the storm as an area of solid red (corresponding to a contour on the RDR-1F

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[183] Melvin, Vol. 33, p. 123; Leech, Vol. 84, pp. 65-66.

[184] Melvin, Vol. 36, p. 113.

[185] Delta Exhibit 3, U.S. Exhibit 84, Kelly Vol. 81, p. 41.

radar) with few or no transitional color areas. This return indicated an intense storm cell.[186]

32. Subsequent of 5:49:29, the CVR of DL 191 contains no conversation attributable to use of airborne weather radar by the flight crew. The lack of such conversation indicates the failure of the flight crew to utilize their radar while approaching the DFW airport or Cell D.

33. By utilizing different tilt angles, the flight crew of Delta Flight 191 could have determined the shape, size, location, intensity, and hazard of Cell D during their approach.[187]

34. Had DL 191 utilized its airborne weather radar, the crew would have noted sharp changes in rainfall intensity and a contour associated with Cell D, which according to Delta policy, would have required the flight crew to avoid Cell D.[188]

35. The crew of DL 191 should have been aware of the volatility of the type of weather in the DFW area on August 2, 1985. The large temperature/dew point spread should have alerted the crew to the danger of downburst or microburst activity.[189]

36. The report of wind gusts to the flight crew of DL 191 by the Local Controller at 6:04:01 provided the crew

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[186] U.S. Exhibit 732-A-6; Hildebrand, vol. 97, p. 12-13.

[187] Leech, Vol. 85, p. 120; Manningham, Vol. 107, p. 151-154.

[188] Manningham, Vol. 107, p. 155.

[189] Hildebrand, Vol. 95, pp. 96-97; McCarthy, Vol. 104, p. 3.

with one more indication of the danger of microburst activity.[190]

37. The flight crew of DL 191, through both their own observations and from ATC communications during their descent and approach to DFW airport, had sufficient information to assess the developing weather situation along the final approach to Runway 17L and make a proper decision either to continue the approach or to take alternate action.

38. The crew of DL 191 knew or should have known that:

a. isolated thunderstorms had been forecast for the DFW area;

b. there was a large temperature/dew point spread at DFW;

c. there were rapidly building cumulus clouds in the vicinity of DFW;

d. lightning had been observed directly in the path of the aircraft;

e. there were contouring radar returns in the vicinity of the north end of the runway;

f. the cloud into which DL flew appeared dark and threatening;[191] and

g. thunderstorms present the hazard of microburst and dangerous wind shear.

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[190] McCarthy, Vol. 104, p. 26.

[191] According to the testimony of Robertson, pilot of the Aero Commander, the thunderstorm in Cell D looked hazardous from the North.

39. The crew of DL 191 knew or should have known of the existence of a thunderstorm in the vicinity of DFW Airport and nonetheless continued the approach. In fact, weather conditions in the terminal area at the time of and immediately before the crash were better known to the crew than to the ATCs.

40. In view of the foregoing findings of fact, the Court holds that attempting to land the aircraft in a thunderstorm constituted negligence on the part of the crew of DL 191, and proximately caused the crash.

Failure to Execute Missed Approach.

41. Two minutes prior to initial ground contact, at 6:03:52, the aircraft was on final approach in landing configuration, descending onto the ILS glide slope at an altitude of about 2000 feet above the ground, and slowing to a target speed of 150 knots. First Officer Price was flying the aircraft, and the Captain was handling the air-ground communications.

42. Aerodynamically, the flight of DL 191 on August 2, 1985, proceeded relatively uneventfully until 6:05:05, the final 47 seconds of the flight. The airplane was descending through a point about 1000 feet above the ground, on the ILS glide slope, at 154.2 knots (Vref[192] plus 17 knots), and holding a nose-up 4.022 degrees pitch attitude.[193]

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[192] V-ref is the speed, calculated with reference to the weight of the airplane, 30 percent above stall. It is used by pilots during the approach and landing phase of the flight. Leech, Vol. 84, p. 52.

[193] Delta Exhibit 517.

43. At 6:05:05, the plane was at an altitude of about 1000 feet, and lightning had been observed in its path. The Captain announced his intention to take the airplane down to 200 feet before making a decision to go-around. At approximately the same time, the aircraft began experiencing a slowly increasing head wind and slight updraft, and thrust was reduced to about half of normal approach thrust. At 6:05:15, the head wind began increasing more rapidly, and, in spite of thrust reduction to idle, the airspeed increased to 173 knots at 6:05:19, two seconds after the onset of a strong downdraft that accompanies entry into heavy rain.[194] At this point, the existence of a downburst should have been obvious to a pilot trained in the subject.

44. In the next ten seconds, the headwind decreased by 28 knots. Before near takeoff thrust was applied, this shear, together with the increasingly strong downdraft, resulted in a loss of 44 knots of airspeed to 129 knots, 21 knots below target airspeed.[195] Probably in response to flight-director commands,[196] the pilot nosed up the aircraft to an unusually high pitch attitude that maintained the flight path near the ILS glide slope in spite of the severe speed loss. It is evidence that in the heavy rain the First Officer was flying fully on instruments. To this point no word or action by the crew indicated an intention to discontinue the approach.

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[194] Bautz, Vol. 3, p. 59; Mullins, Vol. 109, p. 156-157.

[195] McCarthy, Vol. 102, p. 183-184.

[196] Bray, Vol. 73, pp. 43-44.

45. At 6:05:19, the Captain warned the First Officer to "watch your speed," a reference to a rapid airspeed (performance) increase which DL 191 began to experience at 6:05:05. This increase in airspeed indicated a wind shear encounter.

46. At 6:05:20 the sound of intense rain was heard on the CVR, indicating that DL 191 encountered the intense rain shaft associated with the microburst beneath Cell D.

47. At 6:05:21, the Captain warned the First Officer that "You're gonna lose it all of a sudden, there it is," a reference to an anticipated rapid airspeed (performance) loss characteristic of wind shear encounter.

48. The 6:05:19 and 6:05:21 warnings by the Captain to the First Officer were clearly in anticipation of an encounter with wind shear.

49. Between 6:05:25 and 6:05:29, thrust was increased to between 1.46 and 1.47 Engine Pressure Ratio (EPR), just under go-around power.

50. The dramatic airspeed loss of 44 knots at 6:05:28 should have removed any doubt in the pilot's mind that the plane was traversing severe wind shear.[197]

51. At 6:05:32, some airspeed had been recovered due to the high thrust and a momentary reversal of the horizontal wind component, but the aircraft was still below the target speed, flying at a 16 degree nose-up attitude as the downdraft increased 2500 ft./minute. At this point, thrust was reduced somewhat from 1.45 EPR

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[197] Leech Vol. 84, p. 130; McCarthy Vol. 103, pp. 41-42.

to 1.33 EPR, and the aircraft momentarily stabilized on the glide slope. This is a clear indication that the First Officer was not aborting the approach, despite a wind shear encounter and clear evidence of hazardous weather known to the flight crew.[198]

52. At 6:05:35, at slightly above 600 feet and at approximate airspeed of 140 knots, the aircraft experienced a passage through a horizontally disposed vortex flow. From this point forward, the crew of DL 191 was no longer attempting to land the aircraft on that approach, but was attempting to keep the craft airborne. During the last 17 seconds of the flight, the crew could not possibly have escaped from the microburst due to the complexity and intensity of the component winds.

53. The fact that the aircraft survived the initial impact without breaking apart indicates that the descent had been significantly arrested.

54. Avoidance of ground contact would have been likely if the missed approach had been executed when the Captain first perceived indications of microburst wind shear at 6:05:19, while the airplane was between 700 and 800 feet above the ground.

55. The Delta Pilot Operating Manual warns that if the aircraft is less than 500 feet above the ground in shear conditions and glide slope deviation exceeds one dot, a missed approach must be initiated. FAA Advisory Circular AC 00-50A contains a similar caution.

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[198] Bray, Vol. 73, pp. 70-71; Vol. 75, pp. 2-5.

56. The Pilot Operating Manual also advises that the procedures for landing in wind shear are general guidelines to be followed; good judgment must dictate a go-around at any point in the approach and landing phase if conditions appear less than safe.

57. In otherwise normal conditions, it may be reasonable for a pilot to continue an approach when wind shear is experienced above 500 feet. The 500 foot reference in the Advisory Circular is a bottom line beyond which a pilot does not have the option of continuing the approach.[199] However, when deteriorating weather conditions evidence a threat of microburst or severe downburst, a pilot may be negligent in adhering to the 500 feet rule of thumb. Here, the crew had several indications of the potential for microburst and should have been "spring loaded" for such an eventuality. They were aware of the large temperature/dew point spread, wind changes and gusts, had observed lightning, and had experienced wind shear and heavy rain.[200] The crew had already taken an unreasonable risk by continuing their approach in a thunderstorm. The occurrence of wind shear should have prompted the crew to take immediate action to execute a missed approach.

58. A prudent pilot would execute a missed approach by 6:05:18, when encountering a dramatic performance increase of 20 knots. The crew has seen lightning, identified a thunderstorm, and has encountered a

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[199] Manningham, vol. 107, pp. 80-81; Bray, vol. 75, pp. 100-102.

[200] Leech, vol. 84, p. 66.

performance increase. There was no explanation for continuing at this point. Every clue the crew had received was worse than the previous one; weather conditions were deteriorating as heavy rain was encountered at 6:05:20. The crew of Delta flight 191, by 6:05:20, needed no more clues or information in order to make a decision to execute a missed approach.[201]

59. During 6:05:19 to 6:05:35, the First Officer of DL 191 was flying the glide slope, rather than maintaining recommended pitch attitude for wind shear recovery as he should have.[202]

60. After experiencing the effects of a severe wind shear only 80 feet above the guideline height for executing missed approaches, and with knowledge that they were flying in a thunderstorm, the pilot of DL 191 was negligent in failing to execute a missed approach.

61. The failure to execute a missed approach constituted a proximate cause of the crash.

B. Corporate Negligence

Failure to Train Pilots Adequately

62. Delta has a flight training department which has the responsibility of assuring that its pilots receive the necessary training as well as that required by FARS.

63. When a pilot joins Delta he is given initial training for a certain seat; *e.g.*, First Officer in a particular type

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[201] Leech Vol. 84, p. 127-130.

[202] Bray, Vol. 75, pp. 2-5, 103-104.

of aircraft. Thereafter, a pilot is given additional training in the same aircraft but for a different seat.

64. Transitional training is given to a pilot when he moves from one seat in one aircraft to the same seat in another type aircraft.

65. Delta gives its pilots a variety of proficiency checks. These checks include annual recurrent ground school which is composed of one day of training pertaining to equipment and one day of training on timely topics such as windshear or current industry trends.[203]

66. Captains are required to have two proficiency checks or other approved checks every calendar year with at least one proficiency check, training on-line, or line oriented flight training ("LOFT").[204]

67. Each of these training checks is allotted four hours, but since certain maneuvers may be waived, the proficiency check may last less than four hours.[205]

68. Captain Connors would have had a total of only four hours per year in a simulator actually manipulating the controls.[206]

69. Before 1980, simulator windshear training was not provided to Delta pilots. After 1980, as time permitted, Delta pilots received wind shear simulator training.

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[203] Kater, Vol. 77, p. 136.

[204] Kater, Vol. 79, p. 69.

[205] Kater, Vol. 79, p. 78.

[206] Kater, Vol. 79, p. 81.

70. According to expert testimony, wind shear training must be given at every opportunity to keep pilots aware of the necessary maneuvers.

71. Response to wind shear cannot be practiced in line operations, so pilots must continually be refreshed as to the appropriate wind shear recovery procedures in a simulated environment.

72. In wind shear training it is important to have a methodical approach: (1) the detection and avoidance if at all possible; (2) an immediate missed approach in the case of severe windshear encounter (anything in excess of 20 knots is an indication of severe windshear; Delta encountered a shear of 44 knots); (3) when in a serious situation perform the escape maneuver by using maximum thrust and increasing the pitch up to the stick-shaker[207] or activation of the stall warning, if necessary, to stop the descent. Delta did not have such an approach.[208]

73. In 1982, Captain Kater of Delta's Flight Training Department wrote a memo to L-1011 pilots encouraging but not requiring wind shear simulator training be given to those pilots who were up on everything else in training. Evidently the pilots who were behind in their training were to receive no wind shear training.

74. The wind shear training given to Delta pilots was a simple version, and the pilots were not told that an

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[207] As the plan approaches a stall, the control column and wheel held by the pilot begins to shake, indicating an impending stall.

[208] Kelly, Vol. 81, p. 4; Manningham, Vol. 107, p. 92.

actual windshear encounter could be much more complicated.[209]

75. No records of windshear training are kept by Delta merely because none is required by the FAA.[210]

76. There are no documents or evidence showing the amount of windshear simulator training that the crew of DL 191 received.

77. An FAA audit found that (1) Delta's training program provided little time for training for situations encountered in the operational environment and (2) there was no training in such areas as cockpit management and crew coordination, judgment, adverse weather operations, or specific problems Delta encounters in line operations.[211]

78. An FAA audit found that Delta was only upholding the minimum required standards on proficiency checks and that failures were not being recorded. Instead, the proficiency check airmen were recording the failures as "incomplete."[212]

79. This Court finds that, although Delta's overall training program including windshear has been lax, it is not so derelict as to be negligent.

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[209] Kater, Vol. 78, p. 23; Kelly, Vol. 81, pp. 61-62.

[210] Alger, Vol. 112, p. 31; Kelly, Vol. 81, p. 17; Kater, Vol. 77, p. 105.

[211] U.S. Exhibit 547, p. 19.

[212] U.S. Exhibit 547, pp. 21-23.

Delta Meteorology and Flight Control Dispatch Department.

80. Delta Air Lines Meteorological and Flight Control Dispatch Departments are each located at the Atlanta Hartsfield International Airport, in Atlanta, Georgia.

81. Delta Meteorology is a section within the Dispatch Department, located at Atlanta Hartsfield International Airport in Atlanta.

82. The Meteorology Department is staffed by fourteen meteorologists. Only three or four are on duty at one time, including one manager. The forecast positions are manned seven days a week, twenty-four hours a day.

83. Dispatchers are briefed on the weather by the meteorologists so they can provide weather information to Delta flight crews.

84. Flight control or the dispatcher can communicate with all Delta flights over Delta's own radio network.[213]

85. CFR 121.601, "Aircraft Dispatcher Information to Pilot in Command", requires the dispatcher to provide the Captain with all current reports or information on airport conditions and irregularities of navigation facilities that may affect the safety of the flight.

86. Subpart B of CFR 121.601 provides that before a flight begins the dispatcher shall provide the pilot in command with all available weather reports and forecasts of weather phenomena that may affect the safety of the flight, including adverse weather phenomena such as clear air turbulence, thunderstorms and low altitude

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[213] David, Vol. 5, pp. 201-202; Robbins, Vol. 9, p. 122; Gliedt, Vol. 106, p. 57.

windshear for each route to be flown and each airport to be used.

87. Subpart C of CFR 121.601 states that "During a flight the aircraft dispatcher shall provide the pilot in command any additional available information of meteorological conditions, including clear air turbulence, thunderstorms, low altitude windshear, and irregularities of facilities and services that may affect the safety of flight.

88. The dispatcher originates the flight plan and provides weather tailored for the flight.[214]

89. If a pilot has questions about the weather, he can call Dispatch.[215]

90. The sources of weather available to the dispatcher include Delta's own in-house meteorologists who have access to all NWS products.

91. Delta's dispatchers and meteorologists also have available to them a weather radar monitor manufactured by Kavouras.[216]

92. Gliedt, the Delta dispatcher, described the Kavouras radar monitor as a TV set and computer hookup with which he could dial into all NWS radar sites, including SEP, and display "whatever it is that they are displaying."[217]

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[214] Manningham, Vol. 107, pp. 21-22.

[215] McCleery, Vol. 6, p. 87; Ohmsider, Vol. 93, p. 113.

[216] U.S. Exhibit 137-A; Manningham, Vol. 107, pp.25, 27-30.

[217] Gliedt, Vol. 106, pp. 28-29.

93. A pilot should be more likely in a terminal area to give a Pirep to the ATC than to the dispatcher.[218]

94. The pilot's best use of the dispatcher is when the pilot approaches his destination, maybe 100 miles out.[219]

95. When the pilot gets in the terminal area nothing exceeds the convenience and capability of his own airplane radar.[220]

96. The dispatcher does not replace the responsibility of the NWS or ATC's to provide weather information to planes in flight.

97. Delta dispatch did not contact DL 191 at any time after the flight checked in over New Orleans with its required progress report.

98. The failure of the crew of DL 191 to contact the dispatcher after entering the terminal area was not negligence.

99. The failure of the dispatcher to contact DL 191 after the New Orleans contact was not negligence.

Failure to Report Medical Information

100. Over the years, Captain Connors had suffered to a minor degree various medical problems such as vertigo, Bruxism (grinding of the teeth, especially during sleep), anxiety, cardiac, respiratory, and back pain.

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[218] Manningham, Vol. 107, p. 38.

[219] Manningham, Vol. 107, p. 40.

[220] Manningham, Vol. 107, p. 40.

101. None of these medical problems was disabling for more than a few days at a time.

102. The drug Stelazine was prescribed for Captain Connors on numerous occasions.

103. Valium was also prescribed for Captain Connors.

104. Captain Connors, to be qualified to fly, was required to hold a Class 1 medical certificate.[221]

105. Any drug currently used must be reported to the FAA.[222]

106. A pilot is to report to a flight superior if he is under any medication and let the physician decide whether or not the medication should be reported on the airman's application for a medical certificate.[223]

107. The taking of Valium and/or Stelazine would prevent the physical certification of Captain Connors to fly.[224]

108. Captain Connors took Stelazine from September 1982 to the summer of 1985 and this would have disqualified him from flight status.[225]

109. Captain Connors failed to satisfy the mandatory requirements for reporting medical information.

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[221] U.S. Exhibit 640-A; Davis, Vol. 65, p. 135.

[222] Davis, Vol. 65, p. 160; Melvin, Vol. 35, pp. 65-67.

[223] Leech, Vol. 85, pp. 95-96; Manningham, Vol. 107, p. 104.

[224] Davis, Vol. 66, p. 28.

[225] Kowalsky, Vol. 64, pp. 122-123.

110. Captain Connors was negligent in failing to report his medications and satisfy the requirements for reporting medical information.

111. There was no evidence as to when Captain Connors last took medication prior to August 2, 1985, the date of the crash, that could have affected him.

112. Although Captain Connors did not seem as alert during the final moments of the flight as he had been earlier, the evidence is too speculative as to whether Captain Connors was under the influence of any medication at the time of the accident.

113. The accident in question was not proximately caused by Captain Connors' failure to report his medications and to satisfy the requirements for reporting medical information.

VI. GOVERNMENT LIABILITY

A. Failure to Relay Weather Information

1. The duties and responsibilities of air traffic controllers are set forth in the manuals of the Federal Aviation Administration. *In re Air Crash Disaster at New Orleans (Moisant Field), La.*, 422 F.Supp. 1166, 1176 (W.D.Tenn.1975), *aff'd*, 544 F.2d 270 (6th Cir.1976).

2. Under the FAA Air Traffic Control Manual, the first priority of an air traffic controller is separation of aircraft. FAA Order 7110.65D. The provision of weather information is secondary to the primary duty of separation. The air traffic controller must decide, in his judgment, whether other duties permit the performance of

these services. *Mallen v. United States*, 506 F.Supp. 728, 735-36 (N.D.Ga.1979).

3. Air traffic controllers are required to give all information and warnings specified in the manuals, and in certain situations they must give warnings beyond the manuals. Warnings not contained in the manuals must be made only when the danger is immediate, extreme, or known only to the federal personnel; or when the controller is in a better position to evaluate a given situation or to make more accurate observations than the pilot. *Davis v. United States*, 824 F.2d 549, 550 (7th Cir.1987); *First of America Bank-Cent. v. United States*, 639 F.Supp. 446, 455 (W.D.Mich.1986).

4. Government personnel in the DFW Tower on August 2, 1985, were in possession of the following pertinent information concerning the weather that was not transmitted to the crew of DL 191:

(a) the fact that a thunderstorm was occurring off the approach end of the threshold of runway 17L;

(b) the fact that "heavy heavy" rain (as reported by Mr. Kennedy to Joe Connors in the Tracon) was observable from the Tower. This heavy, heavy rain was described by eye witnesses as a wall or curtain of water, portions of which resembled a tornado;

(c) the presence of cloud to ground lightning strokes in the vicinity of the storm to the north of the field beginning as early as 5:55 p.m. and continuing up until at least shortly before the accident. At least five FAA employees in the Tower saw lightening before the accident;

(d) the presence of cumulonimbus (thunderstorm) clouds, observed by the official NWS weather observer, Mr. Del Prete at 5:51 p.m. Mr. Del Prete promptly reported his sightings to Tower personnel; and

(e) radar information showing precipitation returns on the north end of the runway.

5. DFW Tower personnel breached a duty in failing to provide incoming aircraft of the existence of extreme and hazardous weather north of the airport. Although the weather was observable by incoming flights, the controllers did not know this to be a fact, and were not justified in assuming it. The controllers should have sought confirmation of incoming crews' awareness of the hazardous weather.

6. The CWSU meteorologist, on duty on the date of the accident, breached his duties in the following respects:

(a) He took a lengthy dinner break in the government cafeteria beginning at approximately 5:25 p.m. without making any arrangements to see that the weather was monitored during his absence.

(b) He failed to insure that a continuous weather watch was maintained during his absence from his duty post.

7. The Weather Coordinator on duty in the CWSU at the time of the accident breached his duties in the following respects:

(a) He failed to maintain a continuous awareness of all present and forecasted weather conditions that could effect the safe and expeditious flow of air traffic within the

center air space and to serve as the focal point for the collection and dissemination of pertinent weather information as required by the Traffic Management Handbook;

(b) He failed to maintain a continuous weather watch during the meteorologist's absence from his post; and

(c) He failed to monitor the weather on radar during the absence of the meteorologist.

B. Failure to Change Runways

8. The Air Traffic Controller manual never requires that a runway be changed; it only lists criteria to be considered in contemplating a change.[226]

9. Wind is the primary factor in electing to change runways.[227]

10. The ATC Manual directs that, if feasible, the runway most aligned with the wind is to be used when wind velocity is greater than or equal to 5 knots.[228]

11. There was no wind shift before the accident.[229] The winds as a whole favored no particular direction, so landing direction should not have been changed.[230]

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[226] Barker, Joint Ex. 2, pp. 133-134.

[227] Kennedy, Vol. 58, pp. 44, 61-62.

[228] U.S. Exhibit 211; Skipworth, Vol. 60, p. 17, Vol. 61, p. 73; Archung, Vol. 61, pp. 161-162; Beaudoin, Vol. 39, pp. 3-4.

[229] Skipworth, Vol. 61, pp. 74-76; Archung, Vol. 61, pp. 167-169; Kennedy, Vol. 58, p. 57.

[230] Kennedy, Vol. 58, pp. 55-56.

12. Wind criteria for a runway change were not met on August 2, 1985.[231]

13. Controllers change runways due to weather only if pilots refuse to fly through it.[232]

14. Whenever ATC issues a vector, a direction, or a clearance to a pilot, which in the pilot's judgment would jeopardize the safety of the aircraft and its occupants, that pilot has an absolute duty to reject the same, to so inform ATC, and to request a new direction. *In re Air Crash Disaster at Boston, Mass., July 31, 1973*, 412 F.Supp. 959, 989 (D.Mass. 1976), *aff'd sub nom Delta Air Lines, Inc. v. United States*, 561 F.2d 381 (1st Cir.1977), *cert. denied*, 434 U.S. 1064, 98 S.Ct. 1238, 55 L.Ed.2d 764 (1978).

15. No pilot had requested a runway change prior to the crash.[233]

16. Pilots have the responsibility to decide and are the final authority as to the runway which will be used for landing. *Miller v. United States*, 378 F.Supp. 1147, 1151 (E.D.Ky. 1974), *aff'd*, 522 F.2d 386 (6th Cir.1975).

17. Controller's failure to change runways prior to the crash did not constitute negligence.

C. Proximate Cause

18. In order for breaches of duty by government employees to support a finding of negligence, the acts must have proximately caused the crash.

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[231] Kennedy, Vol. 58, pp. 55-57.

[232] Kennedy, Vol 58, pp. 63-64.

[233] Kennedy, Vol. 58, pp. 75-76.

19. Air traffic controllers have the right to rely upon the assumption that a pilot knows and will abide by the applicable Federal Aviation Regulations. Controllers are not required to foresee or anticipate the unlawful, negligent, or grossly negligent acts of pilots. *Colorado Flying Academy, Inc. v. United States*, 506 F.Supp. 1221, 1228 (D.Col.1981), *aff'd*, 724 F.2d 871 (10th Cir.1984), *cert. denied*, 476 U.S. 1182, 106 S.Ct. 2915, 91 L.Ed.2d 544 (1986); *First of America Bank-Cent. v. United States*, 639 F.Supp. 446, 456 (W.D. Mich. 1986); *Air Service, Inc. v. United States*, 18 Av. Cas. (CCH) 17,556, 17,566 (N.D.Miss.1983).

20. Any failure of the air traffic controllers to warn a pilot of the presence of a storm in his path cannot be regarded as a continuing proximate cause after the pilot himself discovered its presence, appreciated the danger, and decided to fly ahead into it. *Black v. United States*, 441 F.2d 741, 745 (5th Cir.1971), *cert. denied*, 404 U.S. 913, 92 S.Ct. 233, 30 L.Ed.2d 186 (1971).

21. The Court is of the opinion that the crew of DL 191 possessed substantially all of the weather information potentially available from government sources. In fact, the crew was aware of additional conditions unknown by government sources, e.g., wind shear and lightening in Cell D.

22. The Court considers the failure of governmental employees to pass on weather information to have been inconsequential to the fate of DL 191 in that there is no evidence that the crew would have acted differently with this confirmation of information already known.

VII. CONCLUSION

Defendant, the United States of America, is entitled to a judgment in its favor inasmuch as Plaintiffs have failed to prove that the United States of America, through its agents, servants or employees, was guilty of any negligence that proximately caused the air crash of DL 191 on August 2, 1985. Judgment will be entered consistent with the foregoing opinion.

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
FORT WORTH DIVISION

IN RE: AIR CRASH AT DALLAS/FORT WORTH AIRPORT ON AUGUST 2, 1985	§ § § § §	MDL DOCKET NO. 657 CIVIL ACTION 4-87-060-K (Consolidated with CIVIL ACTION 4-87-139-K)
KATHLEEN CONNORS, ET AL. VS. UNITED STATES OF AMERICA	§ § § § §	

JUDGMENT

(Filed Sep. 1, 1989)

Consistent with the Memorandum Opinion entered in this case this same date, this Court finds that Plaintiffs have failed to prove that the United States of America was guilty of any negligence that proximately caused the air crash of DL 191 on August 2, 1985, and that judgment is entered in favor of the United States of America. Each party shall bear its own costs.

IT IS SO ORDERED.

SIGNED this 1st day of September, 1989.

/s/ David O. Belew, Jr.
DAVID O. BELEW, JR.
UNITED STATES
DISTRICT JUDGE

Excerpt from United States of America's Response to Delta's Trial Brief Regarding the Duty of Pilots on the Ground to Report Weather Information (Vol. 120)

* * *

duty upon those Delta crews on the ground at DFW Airport, August 2, 1985, to report the weather information they observed.[4] This common law duty is in addition to and independent of the duty to make pilot reports placed upon the Delta Crews by FAR sections 121.561 and 91.125.

CONCLUSION

The failure of Delta crews[5] on the ground to report the hazardous conditions they observed violated 14 C.F.R. sections 121.561 and 91.125 and constitutes negligence as a matter of law. *Associated Aviation Underwriters v. United States*, 462 F. Supp. 674, 680 (N.D. Tex. 1978); *Nixon v. Mr. Property Management Co., Inc.*, 690 S.W.2d 546, 549 (Tex. 1985). Furthermore, the failure to report the hazardous weather conditions breached a common law duty to act reasonably and prudently under the circumstances. These violations and breach proximately caused or contributed to the Delta 191 accident.

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[4] Delta's analysis of this issue as a good samaritan innocent bystander situation fails to recognize the interrelationship and cooperative nature of our nation's air traffic system. By choosing to operate within this system pilots are not innocent bystanders like the defendants in the *Abalos* and *Roberson* cases cited by Delta in its trial brief at pp. 3-4.

[5] The United States contends that certain other pilots on the ground at DFW Airport on August 2, 1985 also failed to report, as required, weather conditions they observed.

Excerpt from Outline of Proof of United States of America, Vol. 125, Part "D", p. 318

* * *

report. [9:125] He described a bamboo curtain of rain. [9:82] Robbins also noted that the cloud he was looking at with his radar should not have been giving such an intense response based upon its visual appearance [9:103]. The return itself indicated a "potential hazard," and Robbins would not have flown through the weather. [9:103-104] Shaw testified that he initially thought his radar returns were inaccurate, because the cloud he was observing visually did not look anything like a thunderstorm. [105:51, 93]

The crew of DL 1051 should have reported this intense return that they were able to obtain on their airborne weather radar while awaiting takeoff. Robbins admitted that had be observed the same radar return while on approach, he would have reported it to ATC, and it would have been of a benefit to other pilots. [9:116-117]

After arriving in line and shutting down his engines, Robbins was not especially occupied, all he was doing was monitoring the ground control frequency; all cockpit duties were completed. [Robbins, 9:115-116]

B. PIREPs RECEIVED BY ATC ON 8/2/85

Prior to the accident, ATC received no PIREPS of weather affecting the operation [Wayson, 53:54-55; Ferguson, 8:189; Gunn, 59:164] or of hazardous weather. [Wayson, 54:30; Krantz, 27:188] The fact that no pilots were complaining about the weather indicated to Skipworth that they were not having problems with the rainshower. [Skipworth, 60:70-71]

Controllers also had not received PIREPs of a thunderstorm at DFW [Wayson, 54:28; Ferguson,

8:178-179, 183-184]; they only had PIREPs of rain or a rainshower. [Hubbert, 52:22; Krantz, 27:185]

If pilots on the ground saw a hazard, they should have provided a PIREP. [Beaudoin, 39:53] Pilots on the ground should have been monitoring the LCE frequency and been aware that Skipworth was not saying anything about the weather which they all had observed and believed to be hazardous. [Beaudoin, 39:57] The LCE frequency was not so busy that pilots were unable to make PIREPs. [Beaudoin, 39:56] If the pilots on the ground who saw a hazard had made a PIREP, the accident would have been avoided. [Beaudoin, 42:20-21]

* * *

1 Texas Pattern Jury Charges (2d ed. 1987)

PJC 4.03 Comparative Negligence

PJC 4.03A Comparative Negligence – Suits Filed on or Before September 1, 1987

If, in answer to Question ___ [*4.01*], you have found that the negligence of more than one of *the persons* named below proximately caused the *occurrence*, then answer Question ___ [*4.03A*]. Otherwise, do not answer Question ___ [*4.03A*].

QUESTION ___

What percentage of the negligence that caused the *occurrence* do you find to be attributable to each of those found by you, in your answer to Question ___ [*4.01*], to have been negligent?

The percentages you find must total 100 percent. The negligence attributable to *a person* named below is not necessarily measured by the number of acts or omissions found.

a. *Don Davis* _____ %

b. *Paul Payne* _____ %

Total 100 %